ENVIRONMENTAL ASSESSMENT

Reducing Wildlife Damage through an Integrated Wildlife Damage Management Program in Palm Beach County, Florida

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ANIMAL AND PLANT HEALTH INSPECTION SERVICE
WILDLIFE SERVICES

In Cooperation with:
PALM BEACH COUNTY
PARKS AND RECREATION DEPARTMENT

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SUMMARY OF PROPOSED ACTION

The Palm Beach County Parks and Recreation Department (PBCPRD) has requested the United States Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (WS) to assist in reducing conflicts and damage associated with wildlife on properties they own and manage in Palm Beach County, Florida. In responding to this request for assistance, WS proposes to implement an Integrated Wildlife Damage Management (IWDM) approach to reduce wildlife damage to property, natural resources, and human/public health and safety. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, target and non-target species, and the environment. Under this action, WS could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, physical exclusion, habitat modification or harassment would be recommended and utilized to reduce damage. In other situations, animals would be removed as humanely as possible using shooting, trapping, nest/egg destruction, chemical methods and other products. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of non-lethal and lethal methods, or could include instances where application of lethal methods alone would be the most appropriate strategy. All management activities would comply with appropriate Federal, State, and Local laws.

ACRONYMS

ADC Animal Damage Control

AMDUCA Animal Medicinal Drug Use Clarification Act
APHIS Animal and Plant Health Inspection Service
AVMA American Veterinary Medical Association

CEQ Council on Environmental Quality
CFR Code of Federal Regulations
DEA Drug Enforcement Administration

EA Environmental Assessment
EIS Environmental Impact Statement
EPA U.S. Environmental Protection Agency

ESA Endangered Species Act

FAA Federal Aviation Administration FDA Food and Drug Administration

FFWCC Florida Fish and Wildlife Conservation Commission FIFRA Federal Insecticide, Fungicide, and Rodenticide Act

FY Fiscal Year

IWDM Integrated Wildlife Damage Management

MBTA Migratory Bird Treaty Act
MIS Management Information System
MOU Memorandum of Understanding
NEPA National Environmental Policy Act

ORV Oral Rabies Vaccination

PBCPRD Palm Beach Parks and Recreation Department

SOP Standard Operating Procedure
T&E Threatened and Endangered
TGE Transmissible Gastroenteritis
USDA U.S. Department of Agriculture
USDI U.S. Department of Interior
USFWS U.S. Fish and Wildlife Service
WDM Wildlife Damage Management

WS Wildlife Services

NOTE: On August 1, 1997, the Animal Damage Control program was officially renamed to Wildlife Services. The phrases Animal Damage Control, ADC, Wildlife Services, and WS are used synonymously throughout this Environmental Assessment.

CHAPTER 1: PURPOSE AND NEED FOR ACTION

1.0 INTRODUCTION

Across the United States, wildlife habitat has been substantially changed as human populations expand and land is used for human needs. These human uses and needs often compete with wildlife which increases the potential for conflicting human/wildlife interactions. In addition, segments of the public desire protection for all wildlife; this protection can create localized conflicts between human and wildlife activities. The *Animal Damage Control Programmatic Final Environmental Impact Statement* (EIS) summarizes the relationship in American culture of wildlife values and wildlife damage in this way United States Department of Agriculture (USDA) 1997:

"Wildlife has either positive or negative values, depending on varying human perspectives and circumstances... Wildlife is generally regarded as providing economic, recreational and aesthetic benefits... and the mere knowledge that wildlife exists is a positive benefit to many people. However... the activities of some wildlife may result in economic losses to agriculture and damage to property... Sensitivity to varying perspectives and value is required to manage the balance between human and wildlife needs. In addressing conflicts, wildlife managers must consider not only the needs of those directly affected by wildlife damage but a range of environmental, sociocultural and economic considerations as well."

Wildlife damage management is the science of reducing damage or other problems associated with wildlife and is recognized as an integral part of wildlife management (The Wildlife Society 1990). The USDA, Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) program (formerly known as Animal Damage Control) uses an Integrated Wildlife Damage Management (IWDM) approach, known as Integrated Pest Management (WS Directive 2.105¹), in which a combination of methods may be used or recommended to reduce wildlife damage. IWDM is described in Chapter 1:1-7 of USDA (1997). These methods may include alteration of cultural practices and habitat and behavioral modification to prevent or reduce damage. The reduction of wildlife damage may also require that local populations be reduced through lethal means.

WS is the federal agency directed by law and authorized to protect American resources from damage associated with wildlife (Act of March 2, 1931, as amended (46 Stat. 1486; 7 U.S.C. 426-426c) and the Rural Development, Agriculture, Related Agencies Appropriations Act of 1988, Public Law 100-102, Dec. 27, 1987. Stat. 1329-1331 (7 U.S.C. 426c), and the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act of 2001, Public Law 106-387, October 28, 2000. Stat. 1549 (Sec 767). To fulfill this Congressional direction, WS activities are conducted to prevent or reduce wildlife damage caused to agricultural, industrial and natural resources; property; livestock; and threats to public health and safety on private and public lands in cooperation with federal, state and local agencies, private organizations, and individuals. Therefore, wildlife damage management is not based on punishing offending animals, but as one means of reducing damage, and is used as part of the WS Decision Model (Slate et al. 1992). The imminent threat of damage or loss of resources is often sufficient for individual actions to be initiated. The need for action is derived from the specific threats to resources or the public.

WS's mission, developed through its strategic planning process, is

- 1) "to provide leadership in wildlife damage management in the protection of America's agricultural, industrial and natural resources, and
- 2) to safeguard public health and safety."

WS Policy Manual - Provides guidance for WS personnel to conduct wildlife damage management activities through Program Directives. WS Directives referenced in this EA can be found in the manual but will not be referenced in the Literature Cited Appendix.

WS's Policy Manual reflects this mission and provides guidance for engaging in wildlife damage management through:

- Training of wildlife damage management professionals;
- Development and improvement of strategies to reduce losses and threats to humans from wildlife;
- Collection, evaluation, and dissemination of management information;
- Informing and educating the public on how to reduce wildlife damage;
- Providing data and a source for limited-use management materials and equipment, including pesticides (USDA 1989).

Normally, according to the APHIS procedures implementing the National Environmental Policy Act (NEPA), individual wildlife damage management actions may be categorically excluded {7 CFR 372.5(c), 60 Fed. Reg. 6,000 -6,003, (1995)}. WS has decided in this case to prepare this EA to facilitate planning, interagency coordination, and the streamlining of program management, and to clearly communicate with the public the analysis of individual and cumulative impacts. In addition, this EA has been prepared to evaluate and determine if there are any potentially significant or cumulative impacts from the proposed and planned damage management program. All wildlife damage management would be undertaken according to relevant laws, regulations, policies, orders and procedures, including the Endangered Species Act (ESA). Notice of the availability of this document will be published in newspapers, consistent with the agency's NEPA procedures.

This environmental assessment (EA) documents the analysis of the potential environmental effects of a proposed wildlife damage management (WDM) program in Palm Beach County, Florida. This analysis relies on data contained in published documents (Appendix A), including the *Animal Damage Control Program Final Environmental Impact Statement* (USDA 1997). The final environmental impact statement (USDA 1997) may be obtained by contacting the USDA, APHIS, WS Operational Support Staff at 4700 River Road, Unit 87, Riverdale, MD 20737-1234.

WS is a cooperatively funded, service-oriented program that receives requests for assistance from private and public entities, including other governmental agencies. Before any wildlife damage management is conducted, Cooperative Agreements, Agreements for Control or other comparable documents are in place. As requested, WS cooperates with land and wildlife management agencies to reduce wildlife damage effectively and efficiently according to applicable federal, state and local laws and Memorandums of Understanding (MOUs) between WS and other agencies. In this case the Palm Beach County Parks and Recreation Department (PBCPRD) has requested WS to assist in reducing conflicts and damage associated with wildlife on properties they own and manage in Palm Beach County, Florida.

1.1 AUTHORITY AND COMPLIANCE

1.1.1 Wildlife Services Legislative Authority

The USDA is directed by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authority for the Wildlife Services program is the Act of March 2, 1931, as amended (46 Stat. 1486; 7 U.S.C. 426-426c) and the Rural Development, Agriculture, Related Agencies Appropriations Act of 1988, Public Law 100-102, Dec. 27, 1987. Stat. 1329-1331 (7 U.S.C. 426c), and the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act of 2001, Public Law 106-387, October 28, 2000. Stat. 1549 (Sec 767), which provides that:

"The Secretary of Agriculture may conduct a program of wildlife services with respect to injurious animal species and take any action the Secretary considers necessary in conducting the program. The Secretary shall administer the program in a manner consistent with all of the wildlife services authorities in effect on the day before the date of the enactment of the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2001."

Since 1931, with changes in societal values, WS policies and its programs place greater emphasis on the part of the Act discussing "bringing (damage) under control", rather than "eradication" and "suppression" of wildlife populations. In 1988, Congress strengthened the legislative directive and authority of WS with the Rural Development, Agriculture, and Related Agencies Appropriations Act. This Act states, in part:

"That hereafter, the Secretary of Agriculture is authorized, except for urban rodent control, to conduct activities and to enter into agreements with States, local jurisdictions, individuals, and public and private agencies, organizations, and institutions in the control of nuisance mammals and birds and those mammals and birds species that are reservoirs for zoonotic diseases, and to deposit any money collected under any such agreement into the appropriation accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities."

Additionally, Memoranda of Understanding among WS and other governmental agencies describe WS responsibilities in wildlife damage management. For example, a Memorandum of Understanding between the Federal Aviation Administration (FAA) and WS recognizes WS role and expertise in providing wildlife hazard management assistance to the aviation community. It states, that the "FAA or the certificated airport may request technical and operational assistance from WS to reduce wildlife hazards."

1.1.2 Florida Game and Freshwater Fish Commission (name was changed in 1999 to: Florida Fish and Wildlife Conservation Commission) - Authority to Manage State Wild Animal Life and Fresh Water Fish Life - Florida Constitution, Article IV, Section 9.

"There shall be a game and fresh water fish commission, composed of five members appointed by the governor subject to confirmation by the senate for staggered terms of five years. The commission shall exercise the regulatory and executive powers of the state with respect to wild animal life and freshwater aquatic life,".

1.1.3 U.S. Fish and Wildlife Service (USFWS)

The USFWS is responsible for managing and regulating take of bird species that are listed as migratory under the Migratory Bird Treaty Act (MBTA) and those that are listed as threatened or endangered under the ESA.

The USFWS authority for action is based on the MBTA of 1918 (as amended), which implements treaties with the United States, Great Britain (for Canada), the United Mexican States, Japan, and the Soviet Union. Section 3 of this Act authorized the Secretary of Agriculture:

"From time to time, having due regard to the zones of temperature and distribution, abundance, economic value, breeding habits, and times and lines of migratory flight of such birds, to determine when, to what extent, if at all, and by what means, it is compatible with the terms of the convention to allow hunting, taking, capture, killing, possession, sale, purchase, shipment, transportation, carriage, or export of any such bird, or any part, nest, or egg thereof, and to adopt suitable regulations permitting and governing the same, in accordance with such determinations, which regulations shall become effective when approved by the President."

The authority of the Secretary of Agriculture, with respect to the Migratory Bird Treaty, was transferred to the Secretary of the Interior in 1939 pursuant to Reorganization Plan No. II. Section 4(f), 4 Fed. Reg. 2731, 53 Stat. 1433.

1.1.4 Florida Department of Agriculture and Consumer Services, Division of Agricultural Environmental Services, Bureau of Pesticides

The primary function of the FDACS Division of Agricultural Environmental Services Bureau of Pesticides (DAESBP) is to ensure compliance with Federal and State laws and regulations regarding the use, sale, transport, disposal, manufacture, and storage of pesticides in the State of Florida. It also promotes pollution prevention and pesticide use reduction initiatives, and supports the Integrated Pest Management strategy. The DAESBP implements systems for the registration of pesticide products, licensing of private and commercial pesticide applicators, and licensing of pesticide businesses. The DAESBP implements regulations found in F.S. Chapter 487, Pesticide Regulation and Safety. The DAESBP certifies and licenses pesticide users, registers pesticide products, and conducts other pesticide-related functions. The DAESBP also enforces State code and Federal FIFRA requirements. Pesticide products and repellents for mammal damage control are registered through FDACS DAESBP by USDA APHIS WS and other entities (eg. pesticide manufacturers). Pesticide products and repellents available for use in mammal damage management in FL are discussed in Appendix B. Prior to conduct of management programs involving registered products or pesticides, current registration status is determined through consultation with the DAESBP.

1.1.5 Compliance with Federal and State Statutes

Several federal laws, state laws, and state regulations regulate WS wildlife damage management. WS complies with these laws and regulations, and consults and cooperates with other agencies as appropriate.

National Environmental Policy Act. Environmental documents pursuant to NEPA must be completed before operational activities consistent with the NEPA decision can be implemented. This EA meets the NEPA requirement for the proposed action in Palm Beach County, Florida. As appropriate, WS coordinates specific projects and programs with other agencies. The purpose of these contacts is to coordinate any wildlife damage management that may affect resources managed by these agencies or affect other areas of mutual concern.

Endangered Species Act (ESA). It is federal policy, under the ESA, that all federal agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the Act (Sec. 2(c)). WS conducts Section 7 consultations with the United States Fish and Wildlife Service (USFWS) to use the expertise of the USFWS to ensure that "any action authorized, funded or carried out by such an agency... is not likely to jeopardize the continued existence of any endangered or threatened species . . . each agency shall use the best scientific and commercial data available" (Sec. 7(a)(2)). WS obtained a Biological Opinion (B.O.) from the U.S. Fish and Wildlife Service describing potential effects on T&E species and prescribing reasonable and prudent measures for avoiding jeopardy (USDA 1997, Appendix F). Additionally, WS conferred with the USFWS in preparation of this EA during 2005, regarding an analysis of potential impacts to federally listed and candidate species (Appendix D) in Florida.

Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711; 40 Stat. 755), as Amended. The MBTA provides the USFWS regulatory authority to protect families of birds that contain species which migrate outside the United States. The law prohibits any "take" of these species by any entities, except as permitted by the USFWS; therefore, the USFWS issues permits to requesters for reducing bird damage. Non-native bird species and domestic waterfowl are not classified as protected migratory birds and therefore have no protection under the MBTA.

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). FIFRA requires the registration, classification, and regulation of all pesticides used in the United States. The U.S. Environmental Protection Agency (EPA) is responsible for implementing and enforcing FIFRA. All chemical methods integrated into the WS program in Florida are registered with and regulated by the EPA and the Florida Department of Agriculture and Consumer Services, Division of Agricultural Environmental Services Bureau of Pesticides and used by WS in compliance with labeling procedures and other requirements.

Executive Order 13186 of January 10, 2001 "Responsibilities of Federal Agencies to Protect Migratory Birds." This Order states that each federal agency, taking actions that have, or are likely to have, a measurable negative effect on migratory bird populations, is directed to develop and implement, a MOU with the USFWS that shall promote the conservation of migratory bird populations. WS has developed a draft MOU with the USFWS as required by this Order and is currently waiting for USFWS approval. WS will abide by the MOU once it is finalized and signed by both parties.

Executive Order 13112 of February 3, 1999. This order directs Federal agencies to use their programs and authorities to prevent the spread or to control populations of invasive species that cause economic or environmental harm, or harm to human health. To comply with Executive Order 13112, WS may cooperate with other Federal, State, or Local government agencies, or with industry or private individuals to reduce damage to the environment or threats to human health and safety.

Occupational Safety and Health Act of 1970. The Occupational Safety and Health Act of 1970 and its implementing regulations (29CFR1910) on sanitation standards states that, "Every enclosed workplace shall be so constructed, equipped, and maintained, so far as reasonably practical, as to prevent the entrance or harborage of rodents, insects, and other vermin. A continuing and effective extermination program shall be instituted where their presence is detected." This standard includes animals that may cause safety and health concerns at workplaces.

The Native American Graves and Repatriation Act of 1990. The Native American Graves Protection and Repatriation Act requires federal agencies to notify the Secretary of the Department that manages the federal lands upon the discovery of Native American cultural items on federal or tribal lands. Federal projects would discontinue work until a reasonable effort has been made to protect the items and the proper authority has been notified.

National Historic Preservation Act (NHPA) of 1966 as amended. The NHPA of 1966, and its implementing regulations (36 CFR 800), requires federal agencies to: 1) determine whether activities they propose constitute "undertakings" that has the potential to cause effects on historic properties and, 2) if so, to evaluate the effects of such undertakings on such historic resources and consult with the Advisory Council on Historic Preservation (i.e. State Historic Preservation Office, Tribal Historic Preservation Officers), as appropriate. WS actions on tribal lands are only conducted at the tribe's request and under signed agreement; thus, the tribes have control over any potential conflict with cultural resources on tribal properties.

Each of the WDM methods described in this EA that might be used operationally by WS do not cause major ground disturbance, do not cause any physical destruction or damage to property, do not cause any alterations of property, wildlife habitat, or landscapes, and do not involve the sale, lease, or transfer of ownership of any property. In general, such methods also do not have the potential to introduce visual, atmospheric, or audible elements to areas in which they are used that could result in effects on the character or use of historic properties. Therefore, the methods that would be used by WS under the proposed action are not generally the types of activities that would have the potential to affect historic properties. If an individual activity with the potential to affect historic resources is planned under an alternative selected as a result of a decision on this EA, then site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary.

There is potential for audible effects on the use and enjoyment of a historic property when methods such as propane exploders, pyrotechnics, firearms, or other noise-making methods are used at or in close proximity to such sites for purposes of hazing or removing animals. However, such methods would only be used at a historic site at the request of the owner or manager of the site to resolve a damage or nuisance problem, which means such use would be to benefit the historic property. A built-in mitigating factor for this issue is that virtually all of the methods involved would only have temporary effects on the audible nature of a site and can be ended at any time to restore the audible qualities of such sites to their original condition with no further adverse effects. Site-specific consultation as required by Section 106 of the NHPA would be conducted as necessary in those types of situations.

Environmental Justice and Executive Order 12898 - "Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations." Executive Order 12898, promotes the fair treatment of people of all races, income levels and cultures with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Environmental justice is the pursuit of equal justice and protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status. Environmental Justice is a priority within APHIS and WS. Executive Order 12898 requires federal agencies to make environmental justice part of their mission, and to identify and address disproportionately high and adverse human health and environmental effects of federal programs, policies and activities on minority and low-income persons or populations. APHIS implements Executive Order 12898 principally through its compliance with NEPA. All WS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898.

WS personnel use only legal, effective, and environmentally safe wildlife damage management methods, tools, and approaches. All chemicals used by APHIS-WS are regulated by the EPA through the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), FDA, FDACS, Memorandum of Understanding (MOU) with Federal natural resource managing agencies, and by ADC Directives. Based on a thorough Risk Assessment, APHIS concluded that when WS program chemicals are used following label directions, they are highly selective to target individuals or populations, and such use has negligible impacts on the environment (USDA 1997, Appendix P). The WS operational program properly disposes of any excess solid or hazardous waste. It is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority and low-income persons or populations.

Protection of Children from Environmental Health and Safety Risks (Executive Order 13045). Children may suffer disproportionately from environmental health and safety risks for many reasons, including their development physical and mental status. Because WS makes it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children, WS has considered the impacts that this proposal might have on children. The proposed wildlife damage management program would only occur by using legally available and approved methods where it is highly unlikely that children would be adversely affected. For these reasons, WS concludes that it would not create an environmental health or safety risk to children from implementing this proposed action.

<u>Investigational New Animal Drug (INAD).</u> The drug alpha-chloralose (AC) has been used as a sedative for animals and is registered with the Food and Drug Administration (FDA) to capture waterfowl, coots, and pigeons. FDA approval for use under INAD (21 CFR, Part 511) authorized WS to use the drug as a non-lethal form of capture.

<u>Federal Food, Drug, and Cosmetic Act (21 U.S.C. 360)</u>. This law places administration of pharmaceutical drugs, including those used in wildlife capture and handling, under the Food and Drug Administration.

<u>Controlled Substances Act of 1970 (21 U.S.C. 821 et seq.)</u>. This law requires an individual or agency to have a special registration number from the federal Drug Enforcement Administration (DEA) to possess controlled substances, including those that are used in wildlife capture and handling.

Animal Medicinal Drug Use Clarification Act of 1994 (AMDUCA). The AMDUCA and its implementing regulations (21 CFR Part 530) establish several requirements for the use of animal drugs, including those used to capture and handle wildlife in damage management programs. Those requirements are: (1) a valid "veterinarian-client-patient" relationship, (2) well defined record keeping, (3) a withdrawal period for animals that have been administered drugs, and (4) identification of animals. A veterinarian, either on staff or on an advisory basis, would be involved in the oversight of the use of animal capture and handling drugs under the proposed action. Veterinary authorities in each state have the discretion under this law to establish withdrawal times (i.e., a period of time after a drug is administered that must lapse before an animal may be used for food) for specific drugs. Animals that might be consumed by a human

within the withdrawal period must be identified; the Western Wildlife Health Committee of the Western Association of Fish and Wildlife Agencies has recommended that suitable identification markers include durable ear tags, neck collars, or other external markers that provide unique identification (WWHC undated). APHIS-WS establishes procedures in each state for administering drugs used in wildlife capture and handling that must be approved by state veterinary authorities in order to comply with this law.

1.2 SCOPE AND PURPOSE OF THIS EA

The scope and purpose of this EA is to address and evaluate the potential impact to the human environment from the implementation of a WS WDM program to protect natural resources, property, and public health and safety on properties located in Palm Beach County, Florida. Several wildlife species have potential to be the subject of WS WDM activities including: raccoon (*Procyon lotor*), opossum (*Didelphus virginianus*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), domestic/feral dog (*Canis familiaris*), feral cat (*Felis catus*), feral domestic waterfowl (ducks and geese), feral pigeon (*Columba livia*), monk parakeet (*Myiopsitta monachus*), feral hog (*Sus scrofa*), armadillo (*Dasypus novemcinctus*), Iguana (*Iguana* spp.), monitor lizard (*Varanus* spp.), eastern gray squirrel (*Sciurus carolinensis*), eastern wood rat (*Neotoma floridanus*), hispid cotton rat (*Sigmodon hispidus*), Norway rat (*Rattus norvegicus*), and black rat (*Rattus rattus*).

In 2002, the Florida WS program, in cooperation with several state and federal government agencies, conducted a NEPA process and developed an EA entitled "Management of Predation Losses to State and Federally Endangered, Threatened, and Species of Special Concern; and Feral Hog Management to Protect Other State and Federally Endangered, Threatened, Species of Special Concern, and Candidate Species of Fauna and Flora in the State of Florida" which evaluated alternatives and impacts to the environment, and selected an IWDM approach to manage damage associated with predators on Federal and State listed threatened and endangered species in Florida beach and dune coastal ecosystems and feral hog damage statewide (USDA 2002). WS predator and feral hog damage management activities to protect Federal and State listed threatened and endangered species will be conducted in accordance with a Finding of No Significant Impact issued for that Environmental Assessment. Pertinent information from that the 2002 EA has been incorporated by reference into this EA.

1.3 NEED FOR ACTION

Properties managed by PBCPRD have become a haven for overabundant nuisance animals. Animals in this category include raccoons, opossums, coyotes, gray foxes, feral waterfowl, feral pigeons, monk parakeets, feral cats, feral dogs, feral hogs, armadillos, iguanas, monitor lizards, eastern gray squirrels, eastern wood rats, hispid cotton rats, Norway rats, and black rats. The presence of these animals can create a host of problems, including concerns over zoonotic diseases, property damage, and natural resources (including threatened and endangered species). PBCPRD contacted WS regarding these concerns, seeking to implement a biologically sound management program to alleviate wildlife damage on PBCPRD properties.

1.3.1 Need to Protect Human Health and Safety

In Palm Beach County, human health and safety concerns and problems associated with wildlife include, but are not limited to the potential for transmission of zoonotic diseases to humans, physical injuries and other problems.

Zoonotic Diseases. A considerable threat to human health is sometimes presented by disease organisms or parasites carried by some animals which are transmissible or infectious to humans. These include viral, bacterial, mycotic (fungal), protozoa, and rickettsial diseases (Table 1-1). Several of these diseases are transmittable to humans.

Table 1-1. Wildlife Diseases That Pose Potential Human Health Risks in the United States (modified from Davidson and Nettles 1997).

Disease	Causative Agent	Hosts		
Anthrax	bacterium (Bacillus antracis)	cattle, sheep, horses, swine, white-tailed deer, dogs, cats		
Dermatophilosis	bacterium (Dermatophilus congolensis)	mammals (wild and domestic)		
Demodectic mange	mange mite (Demodex odocoilei)	White-tailed deer		
Sarcoptic mange	mite (Sarcoptes scabiei)	red foxes, coyotes, domestic dogs		
Swine brucellosis	bacterium (Brucella suis)	Swine		
Trichinosis	nematode (Trichinella spiralis)	swine, bears, raccoons, foxes, rats		
Rabies	virus (Rhabdovirus)	all mammals (high risk wildlife: raccoons, foxes, skunks, bats)		
Visceral larval migrans	nematode (Baylisascaris procyonis)	raccoons, skunks		
Salmonellosis	bacterium (Salmonella spp.)	Reptiles (iguanas, monitor lizards)		
Leptospirosis	bacteria (Leptospira interrogans) over 180 different serovars	All mammals		
Echinococcus infection	tapeworm (Echinococcus multilocularis)	foxes, coyotes		
Bovine brucellosis	bacterium (Brucela abortus)	cattle (evidence from Texas that organism has infected coyotes that scavenged aborted fetuses and placentas of infected cattle)		
Toxoplasmosis	protozoan parasite (Toxoplasma gondii)	Cats, such as bobcats, are definitive hosts, mammals and birds are intermediate hosts		
Spirometra infection	tapeworm, (Spirometra mansonoides)	bobcats, raccoons, foxes, dogs, cats		
Murine typhus	bacteria (Rickettsia mooseri = R. typhi)	rats, mice, as hosts for primary flea, louse or mite host		
Giardiasis	protozoan parasite (Giardia lamblia, G. duodenalis, and other Giardia sptaxonomy controversial)	beavers, coyotes, dogs, cats		
Hantavirus Pulmonary Syndrome	Hantaviruses	Rodents		
Histoplasmosis	fungus (Histoplasma capsulatum)	Fungus occurs in bat guano and bird droppings		
Lyme Disease	spirochete bacterium(Borrelia burgdorferi)	Rodents		
Plague	bacterium (Yersinia pestis)	Rodents		
Tuberculosis	bacterium (Mycobacterium bovis)	Cervids		

In most circumstances, assistance is requested because of a perceived risk to human health or safety associated with wild animals living near humans, from animals acting out of character in human-inhabited areas during the day, or showing no fear when humans are present. Under the proposed action, WS could assist in resolving these types of problems. In the majority of cases, actual transmission of disease may not be the trigger for WDM, but the potential for such transmissions. Thus, it is the risk of disease transmission that is the primary reason for requesting and conducting WDM. Situations where the threat of disease associated with wild or feral animal populations might occur include, but are not limited to:

- Exposure to the threat of raccoon rabies due to high populations of raccoons in urban and suburban areas or from companion animals coming in contact with infected raccoons or other wild/feral animals contracting the virus (i.e. feral cats, skunks, fox, etc.).
- Accumulated droppings from denning or foraging raccoons and subsequent exposure to raccoon roundworm in fecal deposits in areas where humans frequent.

Stray cats (*Felis catus*) serve as major reservoirs for the bacterium *Bartonella* spp. Stray cats and their fleas (*Ctenocephalides felis*) are the only known vectors for infecting house bound cats and humans with this bacterium. Humans are not infected via the flea, but pet cats often are infected by flea bites. Human infections that may result from exposure of this bacterium via stray cats include: cat scratch disease in immunocompromized patients, bacillary angiomatosis, hepatic peliosis in immunocompromised patients, endocarditis, bacteremia, osteolytic lesions, pulmonary nodules, neuroretinitis, and neurologic diseases (Heller et al. 1997). In areas where dog rabies has been eliminated, but rabies in wildlife has not, cats often are the most significant animal transmitting rabies to humans (Eng and Fishbein 1990; Krebs et al. 1996; Vaughn 1976).

Rabies. Rabies poses a direct threat to humans. Rabies is an acute, fatal viral disease of mammals most often transmitted through the bite of a rabid animal. The disease is preventable in humans and many domestic animals species. However, abundant and widely distributed reservoirs among wild mammals complicate rabies control. The vast majority of rabies cases reported to the Centers for Disease Control and Prevention (CDC) each year occur in raccoons, skunks (primarily *Mephitis mephitis*), and bats (Order *Chiroptera*) (USDA 2001). Rabies is one of the oldest recorded diseases; yet today remains a significant management challenge for public health officials. Rabies is a preventable viral disease of mammals, including humans. However, it is fatal without prior vaccination or post-exposure treatment.

In Florida, including Palm Beach County, raccoons are abundant in urban and suburban environments. Raccoon rabies presents a human health threat through potential direct exposure to rabid raccoons, or indirectly through the exposure of pets that encounter rabid raccoons. Raccoon rabies was first identified in Florida around 1953. In 1977, hunters inadvertently relocated rabid animals to Virginia, thus hastening the spread of rabies along the Atlantic seaboard. Today raccoon rabies is present throughout the Atlantic seaboard from Florida to Maine. In the past 21 years, all of the mid-Atlantic and New England states have experienced at least one rabies outbreak. Rabies primarily affects wild animal populations. Currently, raccoons, skunks, bats, foxes, and coyotes have the most significant impact as wildlife carriers of rabies. Domestic animals account for less than 10% of the reported rabies cases, with cats, cattle, and dogs most often reported rabid (CDC 2003b). Cats are the most commonly infected domestic species.

Over the last 100 years, rabies in the United States has changed dramatically. About 90% or greater of all animal cases reported annually to CDC now occur in wildlife (Krebs et al. 2000; CDC 2001a.). Before 1960 the majority of cases were reported in domestic animals. The principal rabies hosts today are wild carnivores and bats. The number of rabies related human deaths in the US had declined from more than 100 annually at the turn of the century to one or two per year in the 1990's (CDC 2003b). Modern day prophylaxis, which is the series of vaccine injections given to people who have been potentially or actually exposed, has proven nearly 100% successful in preventing mortality when administered promptly (CDC 2001a). In the U.S., human fatalities associated with rabies occur in people who fail to seek timely medical assistance, usually because they were unaware of their exposure to rabies. In March, 2003, a 25-year old

Virginia man died from rabies infection, representing the first confirmed human death from the raccoon rabies variant.

Although human rabies deaths are rare, the estimated public health costs associated with disease detection, prevention, and control have risen, exceeding \$300 million annually. These costs include the vaccination of companion animals, maintenance of rabies laboratories, medical costs for exposure case investigations, rabies post-exposure prophylaxis (PEP), and animal control programs (CDC 2003b). Although the number of PEPs given in the U.S. each year is unknown, it is estimated to be about 40,000. When rabies becomes epizootic or enzootic (i.e., present in an area over time but with a low case frequency) in a region, the number of PEPs in that area increases. Although the cost varies, a course of rabies immune globulin and five doses of vaccine given over a 4-week period typically exceeds \$1,000 (CDC 2001a) and has been reported to be as high as \$3,000 or more (Meltzer 1996). As epizootics spread in wildlife populations, the risk of "mass" human exposures requiring treatment of large numbers of people that contact individual rabid domestic animals infected by wild rabid animals increase. One case in Massachusetts involving contact with, or drinking milk from, a single rabid cow required PEPs for a total of 71 persons (CDC) 2001b). The total cost of this single incident exceeded \$160,000 based on a median cost of \$2,376 per PEP in Massachusetts. Likely the most expensive single mass exposure case on record in the U.S. occurred in 1994 when a kitten from a pet store in Concord, NH tested positive for rabies after a brief illness. As a result of potential exposure to this kitten or to other potentially rabid animals in the store, at least 665 persons received post-exposure rabies vaccinations at a total cost of more than \$1.1 million (Noah et al. 1995).

In 2002, there were 182 cases of animal rabies reported in Florida, compared to 198 cases reported during 2001, 162 reported during 2000 and 186 in 1999 (Florida Department of Health website: doh.state.fl.us/Disease_ctrl/epi/Rabies_Guidebook2003.pdf). Rabid animals were identified in 39 Florida counties, and seven counties reported 10 or more cases. The majority of cases were among wild animals, primarily raccoons (N=116, 64%).

There are several waterfowl pathogens that are transmissible to humans, however, the risk of infection is believed low (Centers for Disease Control and Prevention (CDCP) 1998).

Cryptosporidiosis is a disease caused by the parasite Cryptosporidium parvum and was not known to cause disease in humans until 1976 (CDCP 1998). A person can be infected by drinking contaminated water or direct contact with the droppings of infected animals (CDCP 1998). The public is advised to be careful when swimming in lakes, ponds, streams, and pools, and to avoid swallowing water while swimming (Colley 1996). The public is also advised to avoid touching stools of animals and to drink only safe water (Colley 1996). Cryptosporidium can cause gastrointestinal disorders (Virginia Department of Health 1995) and produce life threatening infections in immunocompromised and immunosuppressed people (Roffe 1987, Graczyk et al. 1998). Cryptosporidiosis is recognized as a disease with implications for human health (Smith et al. 1997).

<u>Giardiasis</u> (*Giardia lambia*) is an illness caused by a microscopic parasite. It has become recognized as one of the most common causes of waterborne disease in humans in the United States during the last 15 years (CDCP 1999). Giardiasis is contracted via the fecal-oral route, (oral exposure to contaminated water, or contaminated material.) Infection often causes diarrhea, cramps, and nausea (CDCP 1999).

<u>Salmonella</u> (Salmonella spp.) may be contracted by humans by handling reptiles, or materials soiled with bird or reptile feces (Stroud and Friend 1987). Salmonella causes gastrointestinal illness, including diarrhea.

<u>Chlamydiosis</u> (Chlamydia psittaci), is an airborne bacterium transmitted from diarrhetic feces of infected waterfowl or psittacine birds such as the monk parakeet (Locke 1987). Symptoms in humans often are flu-like with upper or lower respiratory involvement. Severe cases of

Chlamydiosis have occurred among wildlife biologists and others handling snow geese, ducks, and other birds (Wobeser and Brand 1982). Chlamydiosis can be fatal to humans if not treated with antibiotics. Waterfowl, herons, and rock doves (pigeons) are the most commonly infected wild birds in North America (Locke 1987).

Escherichia coli (E. coli) are fecal coliform bacteria associated with fecal material of warm blooded animals. There are over 200 specific serological types of E. coli and the majority are harmless (Sterritt and Lester 1988). Probably the best known serological type of E. coli is E. coli O157:H7, which is a harmful E. coli usually associated with cattle (Gallien and Hartung 1994). Regardless of whether the serological types of E. coli disseminated into watersheds by waterfowl are proven to be harmful to humans, it has been demonstrated that geese can disseminate E. coli into the environment and result in elevated fecal coliform densities in the water column (Hussong et al. 1979). When fecal coliform counts at swimming beaches exceed established standards the beaches are temporarily closed adversely affecting the human quality of life. Unfortunately, linking the elevated bacterial counts to frequency of waterfowl use and attributing the elevated levels to human health threats has been problematic until recently. Advances in genetic engineering have allowed microbiologists to match genetic code of coliform bacteria to specific animal species and link these animal sources of coliform bacteria to fecal contamination (Jamieson 1998, Simmons et al. 1995). Simmons et al. (1995) used genetic fingerprinting to link fecal contamination of small ponds on Fisherman Island, Virginia to waterfowl. Microbiologists were able to implicate waterfowl and gulls as the source of fecal coliform bacteria at the Kensico Watershed, a water supply for New York City (Klett et al. 1998). Also, fecal coliform bacteria counts coincided with the number of Canada geese and gulls roosting at the reservoir.

Roscoe (1999) conducted a survey to estimate the prevalence of pathogenic bacteria and protozoa in resident Canada geese in NJ, and found no Salmonella sp., Shigella sp., or Yersinia sp. isolated from any of the 500 Canada goose samples. However, he did report finding Cryptosporidium sp. in 49 (10%) of the 500 geese, and Giardia sp. in 75 (15%) of the geese. Additionally, the USGS (U.S. Geological Survey 2000) conducted field studies in NJ, VA, and MA to determine the presence of organisms that could cause disease in humans exposed to feces of Canada geese at sites with a history of high public use and daily use by geese. Salmonella spp., Listeria spp., Chlamydia sp., and Giardia spp. were isolated from goose feces in New Jersey (U.S. Geological Survey 2000).

While transmission of disease or parasites from waterfowl to humans has not been well documented, the potential exists (Luechtefeld et al. 1980, Wobeser and Brand 1982, Hill and Grimes 1984, Pacha et al. 1988, Blandespoor and Reimink 1991, Graczyk et al. 1997, Saltoun, et al. 2000). In worst case scenarios, infections may even be lifethreatening for immunocompromised and immunosuppressed people (Roffe 1987, Virginia Department of Health 1995, Graczyk et al. 1998). Even though many people are concerned about disease transmission from feces, the probability of contracting disease from feces is believed to be small. Financial costs related to human health threats involving waterfowl may include testing of water for coliform bacteria, cleaning and sanitizing beaches regularly of feces, contacting and obtaining assistance from public health officials, and implementing non-lethal and lethal methods of wildlife damage management. WS recognizes and defers to the authority and expertise of local and state health officials in determining what does or does not constitute a threat to public health.

Physical Injuries. Waterfowl aggressively defend their nests, nesting areas, and young, and may attack or threaten pets, children, and adults (Smith et al. 1999). Additionally, slipping hazards can be created by the buildup of feces from waterfowl on docks, walkways, and other foot traffic areas, especially near nesting areas where waterfowl spend a considerable amount of time during a concentrated time period. WS records show traffic hazards result from waterfowl straying into busy streets and highways. This can result in accidents as vehicles try to avoid hitting the birds (Wisconsin WS, unpubl. data). In some instances, wild animals (i.e. squirrels, fox, coyote, feral cats, feral dogs, raccoon and opossum) have become accustomed to and have lost their fear of humans. In these cases there is the potential risk of a human injury (bites, scratches, wildlife diseases, etc.) if a person comes in close contact with an aggressive animal.

1.3.2 Need to Protect Property

The Palm Beach County Parks and Recreation Department has several property protection concerns, including property damage from feral ducks; landscape and golf course damage from armadillos and feral hogs; and property damage at campsites from raccoons and opossums.

Waterfowl may cause damage to landscaping, piers, yards, boats, beaches, shorelines, parks, golf courses, driveways, athletic fields, ponds, lakes, rafts, porches, patios, gardens, foot paths, swimming pools, play grounds, and cemeteries. In many cases, people are unable to use and enjoy areas because of waterfowl feces. Costs associated with property damage include labor and disinfectants to clean and sanitize the area; loss of property use; loss of aesthetic value of plants, gardens, aquatic vegetation, and lawns where waterfowl feed and loaf; loss of visitors irritated by having to walk on feces; and loss of time contacting wildlife management agencies on health and safety issues and damage management advice, and implementation of non-lethal and lethal wildlife management methods. The costs of reestablishing overgrazed lawns and cleaning waterfowl feces from sidewalks have been estimated at more than \$60 per bird (Allan et at. 1995).

1.3.3 Need to Protect Natural Resources

Natural resources may be described as those assets belonging to the public and often managed and held in trust by government agencies in trust for citizens. Such resources may be plants or animals, including threatened and endangered species, historic properties, or habitats in general. Examples of natural resources are historic structures and places; parks and recreation areas; natural areas, including unique habitats or topographic features; threatened and endangered plants or animals; and any plant or animal populations which have been identified by the public as a natural resource.

Examples of damage to natural resources is vegetation at a park which is being damaged by feral hog populations, or ground-nesting bird populations which are being decimated by the presence of mammal predators such as feral cats, opossums, raccoons, coyotes, or foxes. Massey (1971) and Massey and Atwood (1979) found that predators can prevent least terns (Sterna antillarum) from nesting or cause them to abandon previously occupied sites. In another study, mammal predators were found to have significantly impacted the nesting success of least terns on sandbars and sandpits (Kirsch 1996). Skunks (Massey and Atwood 1979), red foxes (Minsky 1980), coyotes (Grover and Knopf 1982), and raccoons (Gore and Kinnison 1991) are common predators of least terns. During one 2-year study, coyotes destroyed 25.0-38.5% of all interior least tern nests (Grover 1979). Raccoons are considered a major predator of groundnesting upland bird nests and poults (Speake 1980, Speake et al. 1985, Speake et al. 1969). In Massachusetts, predators destroyed 52-81% of all active piping plover (Charadrius melodus) nests from 1985-1987 (MacIvor et al. 1990). Red foxes accounted for 71-100% of the nests destroyed by predators at the site. Balser et al. (1968) recommended that predator damage management programs target the entire predator complex or compensatory predation may occur by a species not under control, a phenomena also observed by Greenwood (1986). Trautman et al. (1974) concluded that a single species predator damage management program showed some promise for enhancing ring-necked pheasant (Phasianus colchicus) populations. Predator damage management can be an important tool for achieving and maintaining game. nongame, and T&E species production and management objectives. In Florida, WS protects 14 threatened and endangered species, including five species of sea turtles from raccoon, opossum, armadillo, coyote, and skunk predation (USDA 2002).

Soil erosion and sedimentation can cause damage to natural resources. Excessive numbers of waterfowl can remove bank vegetation resulting in erosion of the shoreline and soil sediments being carried by rainwater into lakes, ponds, and reservoirs. Waterfowl may cause damage to natural vegetation, shorelines, parks, ponds, and lakes.

Nutrient loading has been found to increase in wetlands in proportion to increases in the numbers of roosting geese (Kitchell et al. 1999, Manny et al. 1994). In studying the relationship between bird density and phosphorus (P) and nitrogen (N) levels in Bosque Del Apache National Wildlife Refuge in New

Mexico, Kitchell et al. (1999) found an increase in the concentration of both P and N correlated with an increase in bird density. Scherer et al. (undated) determined that waterfowl metabolize food very rapidly and most of the phosphorus contributed by bird feces probably originates from sources within a lake being studied. In addition, assimilation and defecation converted the phosphorus into a more soluble form and, therefore was considered a form of internal loading. Waterfowl have contributed substantial amounts of P and N into lakes through feces creating excessive aquatic macrophyte growth and algae blooms (Scherer et al. undated) and accelerated eutrophication through nutrient loading (Harris et al. 1981).

The American Association of Wildlife Veterinarians (AAWV) considers waterfowl as susceptible to and carriers of disease and parasites. Because of the potential threat to free-ranging waterfowl, the AAWV put forth the following resolution (AAWV, undated):

- "...wild and semi-domestic ducks, geese and swans are susceptible to and carriers of disease and parasites of free-ranging wild ducks, geese, and other birds;..."
- "...the AAWV encourages local authorities and state and federal agencies to cooperate to limit the population of waterfowl on urban water areas to prevent disease outbreaks in semi-domestic as well as free ranging ducks, geese and swans and discourages the practice of relocating nuisance or excess urban ducks, geese and swans to other parks or wildlife areas as a means of local population control."

Nutrient loading from feral ducks is a natural resource issue on PBCPRD properties. Feral ducks are numerous on several PBCPRD sites, and can negatively impact the wetlands on these properties, as well as compete with desirable native waterfowl and shorebirds for resources. Another PBCPRD concern is predator damage management to protect T&E species, particularly sea turtle nests on parks with beach frontage. This issue has been addressed in the Florida Threatened and Endangered Species EA for which a FONSI was issued in 2002. Non-native species (particularly iguanas and monitor lizards) found on PBCPRD properties compete with native species, and may be negatively impacting T&E species. Feral cats prey on native species, including T&E species.

1.4 RELATIONSHIP TO OTHER ENVIRONMENTAL DOCUMENTS

ADC Programmatic Environmental Impact Statement. WS, previously called Animal Damage Control (ADC), has issued a Final EIS on the national APHIS/WS program (USDA 1997). Pertinent and current information available in the EIS has been incorporated by reference into this EA.

Wildlife Services Management of Predation Losses to State and Federally Endangered, Threatened, and Species of Special Concern; and Feral Hog Management to Protect Other State and Federally Endangered, Threatened, Species of Special Concern, and Candidate Species of Fauna and Flora in the State of Florida Environmental Assessment and Finding of No Significant Impact. In 2002, the Florida WS program issued a Finding of No Significant Impact and a Final Environmental Assessment which evaluated alternatives and impacts to the environment and selected an IWDM approach to manage damage associated with predators on Federal and State listed threatened and endangered species in Florida beach and dune coastal ecosystems and feral hog damage statewide (USDA 2002). Pertinent information from this document has been incorporated by reference into this EA.

Wildlife Services Rabies Management Environmental Assessment and Finding of No Significant Impact. In 2001, the WS program issued a Finding of No Significant Impact and a Final Environmental Assessment entitled, "Oral Vaccination to Control Specific Rabies Virus Variants in Raccoons, Gray Foxes, and Coyotes in the United States," which analyzed the environmental effects of APHIS WS involvement in the funding of and participation in oral rabies vaccination programs to eliminate or stop the spread of rabies in a number of eastern states (including Florida) and gray fox and coyote rabies in Texas (USDA 2001). APHIS WS determined the action would not have any significant impact on the quality of the human environment. Pertinent information from this document has been incorporated by reference into this EA.

1.5 PROPOSED ACTION

The Palm Beach County Parks and Recreation Department has requested WS to assist in reducing conflicts and damage associated with wildlife on properties they own and manage in Palm Beach County, Florida. In responding to this request for assistance, WS proposes to implement an IWDM approach to reduce wildlife damage to property, natural resources, and human/public health and safety. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, target and non-target species, and the environment. Under this action, WS could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, physical exclusion, habitat modification or harassment would be recommended and utilized to reduce damage. In other situations, animals would be removed as humanely as possible using shooting, trapping, nest/egg destruction, chemical methods and other products. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of nonlethal and lethal methods, or could include instances where application of lethal methods alone would be the most appropriate strategy. All management activities would comply with appropriate Federal, State, and Local laws.

1.6 DECISION TO BE MADE

Based on the scope of this EA, the decisions to be made are:

- Should WS implement an integrated wildlife damage management strategy, including technical assistance and direct control, to meet the need for wildlife damage management on properties owned and managed by PBCPRD?
- If not, should WS attempt to implement one of the alternatives to an integrated wildlife damage management strategy as described in the EA?
- Would the proposed action have significant impacts on the quality of the human environment, requiring preparation of an EIS?

1.7 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT ANALYSIS

1.7.1 Actions Analyzed

This EA evaluates wildlife damage management by WS to protect 1) property; 2) natural resources; and 3) public health and safety on properties owned and managed by PBCPRD in Palm Beach, Florida. Protection of other resources or other program activities would be addressed in other NEPA analysis, as appropriate.

1.7.2 Period for which this EA is Valid

This EA would remain valid until the WS program in Florida and other appropriate agencies determine that new needs for action, changed conditions or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document would be supplemented pursuant to NEPA. Review of the EA would be conducted each year to ensure that the analysis of environmental impacts provided in the EA is sufficient.

1.7.3 Site Specificity

This EA analyzes the potential impacts of WS involvement in implementing a WDM program on properties owned and managed by PBCPRD in Palm Beach County, Florida. Upon request for assistance WS could conduct management activities on any or all of the PBCPRD properties located in the county

1.7.4 Summary of Public Involvement

Issues related to the proposed action were initially developed by WS and PBCPRD. Issues were defined and preliminary alternatives were identified. As part of this process, and as required by the Council on Environmental Quality (CEQ 1981) and APHIS-NEPA implementing regulations, this document and its Decision are being made available to the public through "Notices of Availability" (NOA) published in local media and through direct mailings of NOA to parties that have specifically requested to be notified. New issues or alternatives raised after publication of public notices will be fully considered to determine whether the EA and its Decision should be revisited and, if appropriate, revised.

1.8 PREVIEW OF THE REMAINDER OF THIS EA

The remainder of this EA is composed of four (4) chapters and seven (7) appendices. Chapter 2 discusses and analyzes the issues and affected environment. Chapter 3 contains a description of each alternative, alternatives not considered in detail, mitigation, and standard operating procedures (SOP). Chapter 4 analyzes environmental consequences and the environmental impacts associated with each alternative considered in detail. Chapter 5 contains the list of preparers and those consulted during this EA process. Appendix A is a list of the literature cited during the preparation of the EA; Appendix B is a detailed description of the WDM methods that may be used; Appendices C-F are comprehensive lists of Federal and FL T&E species and correspondence with the FFWCC and FWS regarding T&E species; and Appendix G is the Palm Beach County Park Operations Division – Park Information for Animal Management Plan.

CHAPTER 2: ISSUES AND AFFECTED ENVIRONMENT

2.0 INTRODUCTION

Chapter 2 contains a discussion of the issues, including issues that received detailed environmental impact analysis in Chapter 4 (Environmental Consequences), issues used to develop mitigation measures and SOPs, and issues not considered in detail, with the rationale. Pertinent portions of the affected environment are included in this chapter and in the discussion of issues used to develop mitigation measures. Additional affected environments are incorporated into the discussion of the environmental impacts in Chapter 4 and the description of the proposed program in Chapter 3.

2.1 AFFECTED ENVIRONMENT

The areas of the proposed action include properties owned and managed by Palm Beach County Parks and Recreation Department in Palm Beach County, Florida, including the parks identified in Appendix G.

2.2 ISSUES ANALYZED IN DETAIL IN CHAPTER 4

The following issues have been identified as areas of concern requiring consideration in this EA. These will be analyzed in detail in Chapter 4:

- Effects on target wildlife species
- Effects on other wildlife species, including T&E species
- Effects on human health and safety
- Impacts to stakeholders, including aesthetics
- Humaneness and animal welfare concerns of methods used

2.2.1 Effects on Target Wildlife Species

Of interest to WS, program recipients, decision-makers, and members of the public is whether wildlife damage management actions adversely affect the viability of target species populations. The target species selected for analysis in this EA include: raccoon (Procyon lotor), opossum (Didelphus virginianus), coyote (Canis latrans), gray fox (Urocyon cinereoargenteus), domestic/feral dog (Canis familiaris), feral cat (Felis catus), feral domestic waterfowl (ducks and geese), feral pigeon (Columba livia), monk parakeet (Myiopsitta monachus), feral hog (Sus scrofa), armadillo (Dasypus novemcinctus), Iguana (Iguana spp.), monitor lizard (Varanus spp.), eastern gray squirrel (Sciurus carolinensis), eastern wood rat (Neotoma floridanus), hispid cotton rat (Sigmodon hispidus), Norway rat (Rattus norvegicus), and black rat (Rattus rattus)...

2.2.2 Effects on Other Wildlife Species, including T&E Species

WS, PBCPRD, and the rest of the wildlife management profession, as well as the public, are concerned about whether the proposed action or any of the alternatives might result in adverse impacts to populations of other wildlife, especially T&E species. WS' mitigation measures and SOPs are designed to reduce the effects on non-target species' populations and are presented in Chapter 3. To reduce the risks of adverse affects to non-target species, WS would select damage management methods that are target-selective or apply such methods in ways to reduce the likelihood of capturing or killing non-target species.

Threatened and Endangered (T&E) species lists for the USFWS and State of Florida were reviewed to identify potential effects on federal and state listed T&E species. Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions or mitigation measures. WS has consulted with the USFWS under Section 7 of the ESA concerning potential effects of WDM methods on T&E species and has obtained a Biological Opinion (B.O.). For the full context of the B.O., see Appendix F of the ADC FEIS (USDA 1997). WS also

consulted with the USFWS Florida Field Office under Section 7 during this EA process, to ensure that potential effects on T&E species were adequately addressed (correspondence in Appendix D).

Some members of the public are concerned that the use of chemical methods to reduce wildlife damage would have adverse impacts on other wildlife species, including T&E species. Based on a thorough Risk Assessment, APHIS concluded that when WS program chemicals are used according to label directions, they are selective to target individuals or populations, and such use has negligible impacts on the environment (USDA 1997, Appendix P)

2.2.3 Effects on Human Health and Safety

Safety and efficacy of chemical control methods.

Some individuals may have concerns that chemicals used for wildlife damage management should not be used because of potential adverse effects on people from being exposed to the chemicals directly or to the animals that have died as a result of the chemical use.

Other individuals may have concerns that there is a potential for drugs used in animal capture, handling, and euthanasia to cause adverse health effects in humans that hunt and eat the species involved. Among the species to be captured and handled under the proposed action, this issue is expected to only be of concern for wildlife which are hunted and sometimes consumed by people as food.

Impacts on human safety of non-chemical WDM methods

Some people may be concerned that WS's use of firearms, traps, snares and pyrotechnic scaring devices could cause injuries to people. WS personnel occasionally use traps, snares and firearms to remove animals that are associated with damage. There is some potential fire hazard to agricultural sites and property from pyrotechnic use.

Firearm use is a very sensitive public concern because of safety relating to the public and the threat of misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards (WS Directive 2.615). WS employees who carry firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as stated in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

Impacts on human health and safety from wildlife

The concern stated here is that the absence of adequate WDM would result in adverse effects on human health and safety, because wildlife damage would not be curtailed or reduced to the minimum levels possible and practical. The potential impacts of not conducting such work could lead to increased incidence of injuries, illness, or loss of human lives.

2.2.4 Impacts to Stakeholders, including Aesthetics

Aesthetics is a philosophy dealing with the nature of beauty, or the appreciation of beauty. Therefore, aesthetics is subjective in nature and is dependent on what an observer regards as beautiful. The human attraction to animals has been well documented throughout history and started when humans began domesticating animals. The American public is no exception, and today a large percentage of households have pets. However, some people may consider individual wild animals and birds as "pets" or exhibit affection toward these animals, especially people who enjoy coming in contact with wildlife. Therefore, the public reaction is variable and mixed to wildlife damage management because there are numerous

philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to reduce conflicts/problems between humans and wildlife. There may be some concern that the proposed action or alternatives would result in the loss of aesthetic benefits to the public, resource owners, or neighboring residents. Wildlife generally is regarded as providing economic, recreational, and aesthetic benefits (Decker and Goff 1987), and the mere knowledge that wildlife exists is a positive benefit to many people.

Wildlife populations provide a range of social and economic benefits (Decker and Goff 1987). These include direct benefits related to consumptive and non-consumptive use (e.g., wildlife-related recreation, observation, harvest, sale), indirect benefits derived from vicarious wildlife related experiences (e.g., reading, television viewing), and the personal enjoyment of knowing wildlife exists and contributes to the natural ecosystems (e.g., ecological, existence, bequest values) (Bishop 1987). Direct benefits are derived from a user's personal relationship to animals and may take the form of direct consumptive use (using the animal or intending to) or non-consumptive use (viewing the animal in nature or in a zoo, photography) (Decker and Goff 1987). Indirect benefits or indirect exercised values arise without the user being in direct contact with the animal and come from experiences such as looking at photographs and films of wildlife, reading about wildlife, or benefiting from activities or contributions of animals such as their use in research (Decker and Goff 1987). Indirect benefits come in two forms: bequest and pure existence (Decker and Goff 1987). Bequest is providing for future generations and pure existence is merely knowledge that the animals exist (Decker and Goff 1987).

Many people, directly affected by problems and threats to public health or safety associated with wildlife, insist upon their removal when they cause damage. Some members of the public have an idealistic view and believe that all wildlife should be captured and relocated to another area to alleviate damage or threats to public health or safety. Others, directly affected by the problems caused by wildlife, strongly support removal. Individuals not directly affected by the harm or damage caused by wildlife may be supportive, neutral, or totally opposed to any removal of wildlife from specific locations or sites. Those totally opposed to wildlife damage management want WS to teach tolerance for damage and threats to public health or safety, and that wildlife should never be killed. Some people would strongly oppose removal of animals regardless of the amount and type of damage. Some members of the public who oppose removal of wildlife do so because of human-affectionate bonds with individual animals. These human-affectionate bonds are similar to attitudes of a pet owner and result in aesthetic enjoyment.

Management actions taken by WS would be carried out in a caring, humane, and professional manner.

2.2.5 Humaneness and Animal Welfare Concerns of Methods Used

Humaneness, in part, is a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently.

The issue of humaneness and animal welfare, as it relates to the killing or capturing of wildlife is an important and very complex concept that can be interpreted in a variety of ways. Schmidt (1989) indicated that vertebrate pest damage management for societal benefits could be compatible with animal welfare concerns, if "... the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process." Suffering is described as a "... highly unpleasant emotional response usually associated with pain and distress." However, suffering "... can occur without pain...," and "... pain can occur without suffering..." (AVMA 1987). Because suffering carries with it the implication of a time frame, a case could be made for "... little or no suffering where death comes immediately..." (CDFG 1991), such as shooting.

Defining pain as a component in humaneness of WS methods appears to be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain, and identifying the causes that elicit pain responses in humans would "... probably be causes for pain in other animals..." (AVMA 1987). However, pain experienced by individual animals probably ranges from little or no pain to considerable pain (CDFG 1991).

The AVMA states "... euthanasia is the act of inducing humane death in an animal" and "... the technique should minimize any stress and anxiety experienced by the animal prior to unconsciousness." (AVMA 2001). Some people would prefer AVMA accepted methods of euthanasia to be used when killing all animals, including wild and feral animals. The AVMA states that "For wild and feral animals, many of the recommended means of euthanasia for captive animals are not feasible. In field circumstances, wildlife biologists generally do not use the term euthanasia, but terms such as killing, collecting, or harvesting, recognizing that a distress- free death may not be possible." (AVMA 2001).

The decision-making process involves tradeoffs between the above aspects of pain and humaneness. Therefore, humaneness, in part, appears to be a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. One challenge with coping with this issue is how to achieve the least amount of animal suffering within the constraints of current technology and resources. WS has improved the selectivity and humaneness of management techniques through research and development. Research is continuing to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some WDM methods are used in situations where non-lethal damage management methods are not practical or effective.

Florida WS personnel are experienced and professional in their use of management methods so that they are humane within the constraints of current technology and resources. Mitigation measures and standard operating procedures used to maximize humaneness are described in Chapter 3.

2.3 ISSUES NOT CONSIDERED IN DETAIL WITH RATIONALE

2.3.1 Effectiveness of Wildlife Damage Management Methods

A concern among members of the public is whether the methods of reducing wildlife damage will be effective in reducing or alleviating damage and conflicts. The effectiveness of each method or methods can be defined in terms of decreased potential for health risks, decreased human safety hazards, reduced property damage, and reduced natural resource damage. In terms of the effectiveness of a specific method or group of methods, this would not only be based on the specific method used, but more importantly upon the skills and abilities of the person implementing the control methods and the ability of that person to determine the appropriate course of action to take. It would be expected that the more experience a person has in addressing wildlife damage conflicts and implementing control methods the more likely they would be successful reducing damage to acceptable levels. WS technical assistance program provides information to assist persons in implementing their own WDM program, but at times the person receiving WS technical assistance may not have the skill or ability to implement the WDM methods recommended by WS. Therefore, it is more likely that a specific WDM method or group of methods would be effective in reducing damage to acceptable levels when WS professional wildlife damage assistance is provided than that would occur when the inexperienced person attempts to conduct WDM activities.

CHAPTER 3: ALTERNATIVES

3.0 INTRODUCTION

Alternatives were developed for consideration using the WS Decision Model (Slate et al. 1992) as described in Chapter 2 (pages 20-35), Appendix J (Methods of Control), Appendix N (Examples of WS Decision Model), and Appendix P (Risk Assessment of Wildlife Damage Control Methods Used by USDA, Wildlife Services Program) of the ADC FEIS (USDA 1997).

The No Action alternative is a procedural NEPA requirement (40 CFR 1502), is a viable and reasonable alternative that could be selected, and serves as a baseline for comparison with the other alternatives. The No Action alternative, as defined here, is consistent with the Council on Environmental Quality's (CEQ's) definition (CEQ 1981).

Alternatives analyzed in detail are:

- Alternative 1: Technical Assistance Only. (No Action)
- Alternative 2: Integrated Wildlife Damage Management Program. (Proposed Action)
- Alternative 3: Non-lethal Wildlife Damage Management Only By WS
- Alternative 4: No Federal WS Wildlife Damage Management.

3.1 DESCRIPTION OF THE ALTERNATIVES

3.1.1 Alternative 1: Technical Assistance Only (No Action)

This alternative would not allow for WS operational WDM on PBCPRD properties. WS would only provide technical assistance and make recommendations when requested. The PBCPRD could conduct WDM using any legal lethal or non-lethal method available to them.

3.1.2 Alternative 2: Integrated Wildlife Damage Management Program (Proposed Action)

The Palm Beach County Parks and Recreation Department has requested WS to assist in reducing conflicts and damage associated with wildlife on properties they own and manage in Palm Beach County, Florida. In responding to this request for assistance, WS proposes to implement an IWDM approach to reduce wildlife damage to property, natural resources, and human/public health and safety. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, target and non-target species, and the environment. Under this action, WS could provide technical assistance and direct operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, physical exclusion, habitat modification, or harassment would be recommended and utilized to reduce damage. In other situations, animals would be removed as humanely as possible using shooting, trapping, nest/egg destruction, chemical methods, and other products. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage problem. The most appropriate response could often be a combination of nonlethal and lethal methods, or could include instances where application of lethal methods alone would be the most appropriate strategy. All management activities would comply with appropriate Federal, State, and Local laws.

3.1.3 Alternative 3: Non-lethal Wildlife Damage Management Only by WS

This alternative would require WS to use non-lethal methods only to resolve wildlife damage problems on PBCPRD properties. Information on lethal WDM methods would still be available through other sources such as Florida Fish and Wildlife Conservation Commission, USDA Agricultural Extension Service offices, universities, or pest control organizations. The PBCPRD could choose to implement WS non-

lethal recommendations, implement lethal methods, or methods not recommended by WS, contract for WS non-lethal direct control services, use contractual services of private businesses, or take no action. The PBCPRD could still resort to lethal methods that were available to them.

3.1.4 Alternative 4: No Federal WS Wildlife Damage Management

This alternative would eliminate WS involvement in WDM on PBCPRD properties. WS would not provide direct operational or technical assistance. PBCPRD would have to conduct their own WDM without WS input. Information on WDM methods would still be available through other sources such as Florida Game and Freshwater Fish Commission, USDA Agricultural Extension Service offices, universities, or pest control organizations. The PBCPRD might choose to conduct WDM themselves, use contractual services of private businesses, or take no action.

3.2 WDM STRATEGIES AND METHODOLOGIES AVAILABLE TO WS IN FLORIDA

The strategies and methodologies described below include those that could be used or recommended under Alternatives 1, 2 and 3 described above. Alternative 4 would terminate both WS technical assistance and operational WDM by WS. Appendix B is a more thorough description of the methods that could be used or recommended by WS.

3.2.1 Integrated Wildlife Damage Management (IWDM)

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. The philosophy behind IWDM is to implement the best combination of effective management methods in the most cost-effective² manner while minimizing the potentially harmful effects on humans, target and non-target species, and the environment. IWDM may incorporate cultural practices (e.g., animal husbandry), habitat modification (e.g., exclusion), animal behavior modification (e.g., scaring), removal of individual offending animals, local population reduction, or any combination of these, depending on the circumstances of the specific damage problem.

3.2.2 The IWDM Strategies Employed by WS

Technical Assistance Recommendations

"Technical assistance" as used herein is information, demonstrations, and advice on available and appropriate wildlife damage management methods and approaches. The implementation of damage management actions is the responsibility of the requester. In some cases, WS provides supplies or materials that are of limited availability for use by non-WS entities. Technical assistance may be provided through a personal or telephone consultation, or during an on-site visit with the requester. Generally, several management strategies are described to the requester for short and long-term solutions to damage problems. These strategies are based on the level of risk, need, and the practicality of their application. In some instances, wildlife-related information provided to the requestor by WS results in tolerance/acceptance of the situation. In other instances, management options are discussed and recommended.

Under APHIS, NEPA implementing regulations and specific guidance for the WS program, WS technical assistance is categorically excluded from the need to prepare an EA or EIS. However, it is discussed in this EA because it is an important component of the IWDM approach to resolving wildlife damage problems.

Direct Damage Management Assistance (Direct Control)

Direct damage management assistance includes damage management activities that are directly conducted or supervised by WS personnel. Direct damage management assistance may be initiated when the problem

² The cost of management may sometimes be secondary because of overriding environmental, legal, human health and safety, animal welfare, or other concerns.

cannot effectively be resolved through technical assistance alone and when Agreements for Control or other comparable instruments are provided for direct damage management by WS. The initial investigation defines the nature, history, and extent of the problem; species responsible for the damage; and methods available to resolve the problem. The professional skills of WS personnel are often required to effectively resolve problems, especially if restricted use chemical methods are necessary or if the problems are complex.

Educational Efforts

Education is an important element of WS program activities because wildlife damage management is about finding balance and coexistence between the needs of people and needs of wildlife. This is extremely challenging as nature has no balance, but rather, is in continual flux. In addition to the routine dissemination of damage management recommendations and information; lectures, courses, and demonstrations are provided to producers, homeowners, state and county agents, colleges and universities, and other interested groups. WS frequently cooperates with other agencies in education and public information efforts. Additionally, technical papers are presented at professional meetings and conferences so that WS personnel, other wildlife professionals, and the public are periodically updated on recent developments in damage management technology, programs, laws and regulations, and agency policies.

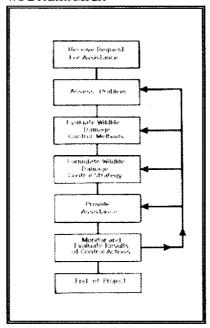
Research and Development

The National Wildlife Research Center (NWRC) functions as the research arm of WS by providing scientific information and development of methods for wildlife damage management that are effective and environmentally responsible. NWRC scientists work closely with wildlife managers, researchers, field specialists, and others to develop and evaluate wildlife damage management techniques. NWRC scientists have authored hundreds of scientific publications and reports, and are respected world-wide for their expertise in wildlife damage management.

3.2.3 WS Decision Making

WS personnel use a thought process for evaluating and responding to damage complaints which is depicted by the WS Decision Model and described by Slate et al. (1992) (Figure 3-1). WS personnel are frequently contacted after requesters have tried or considered non-lethal methods and found them to be impractical, too costly, or inadequate for effectively reducing damage. WS personnel assess the problem then evaluate the appropriateness and availability (legal and administrative) of strategies and methods based on biological, economic, and social considerations. Following this evaluation, methods deemed to be practical for the situation are incorporated into a management strategy. After this strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for further management is ended. In terms of the WS Decision Model (Slate et al. 1992), most damage management efforts consist of continuous feedback between receiving the request and monitoring the results of the damage management strategy. The Decision Model is not a written documented process, but a mental problem-solving process common to most, if not all, professions.

Figure 3-1 WS Decision Model



3.2.4 Wildlife Damage Management Methods Available for Use (See Appendix B for a more detailed description of each method or approach.)

3.2.4.1 Non-chemical Methods

Exclusion prevents wildlife access to protected resources through fencing, netting, or other physical barriers.

Cultural methods³ and habitat modifications are typically implemented by resource owner or manager consist primarily of non-lethal preventive methods which minimize exposure of the protected resource to wildlife that would cause damage or pose a threat.

Habitat/environmental modification to repel certain wildlife species.

Animal behavior modification refers to tactics that alter the behavior of animals to reduce damage. Some, but not all of these tactics include the following:

- Propane exploders
- Pyrotechnics
- Distress calls and sound producing devices
- Visual repellents and other scaring tactics

Live Capture and Relocation of wildlife is through use of live traps designed to capture animals alive. Captured target animals can then be relocated to other field locations or to animal shelters, pursuant to State laws and regulations.

Traps, including leg-hold traps, snap traps, snares, panel nets, rocket nets, clover traps, decoy traps, hand nets, etc.

³ Generally involves modifications to the management of protected resources to reduce their vulnerability to wildlife damage.

Shooting is helpful in some situations to supplement and reinforce other dispersal techniques and to kill animals that are live captured. It is selective for target species and may be used in conjunction with the use of spotlights, calling, and other alternative legal tools (elevated positions, stands, etc.). Shooting with firearms is sometimes used to manage wildlife damage problems when lethal methods are determined to be appropriate. The animals are killed as quickly and humanely as possible.

Nest destruction of the target species before eggs or young are in the nest.

Egg treatment/destruction is the practice of ceasing the development of the egg prior to hatching (egg oiling, chilling, shaking, puncturing); physically breaking eggs; or directly removing eggs from a nest and destroying them.

Cervical dislocation is sometimes used to euthanize birds that are live captured. AVMA approves this technique as humane method of euthanasia and states that cervical dislocation when properly executed is a humane technique for euthanasia of poultry and of small birds (Beaver et al. 2001).

Sport harvest through hunting and trapping is often an important part of WDM strategies, and is recommended by WS to enhance the effectiveness of other damage management techniques and to accomplish population management objectives.

3.2.4.2 Chemical Methods

Repellents are usually naturally occurring substances that are chemically formulated to be distasteful or to elicit pain or discomfort to target animals when they are encountered.

Alpha-chloralose is used as an immobilizing agent, which is a central nervous system depressant, and used to capture waterfowl or other birds. It is generally used in recreational and residential areas, such as swimming pools, shoreline residential areas, golf courses, or resorts. Alpha-chloralose is typically delivered as a well-contained bait in small quantities with minimal hazards to pets and humans; single bread or corn baits are fed directly to the target birds.

Carbon dioxide (CO_2) gas is an AVMA-approved euthanasia method (AVMA 2001) which is sometimes used to euthanize animals that have been chemically immobilized or captured in live traps. Live animals are placed in a container or chamber into which CO_2 gas is released. The animals quickly expire after inhaling the CO_2 .

Drugs such as anesthetics (Ketamine, Telazol), sedatives (analgesics) (Xylazine), euthanasia agents (Sodium Pentobarbital and its derivatives, Potassium Chloride) and accessory drugs (Yohimbine, antibiotics, etc.) are used to capture, sedate, handle, and/or euthanize animals involved in wildlife damage or disease situations. These and other drugs are available for WS use, pursuant to State and Federal regulations, and are identified as "approved immobilizing drugs" by the WS program through its Immobilization and Euthanasia Committee.

3.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE

3.3.1 Lethal Wildlife Damage Management Only By WS

Under this alternative, WS would not conduct any non-lethal control of wildlife for WDM purposes on PBCPRD properties, but would only conduct lethal WDM. This alternative was eliminated from further analysis because some wildlife damage problems can be resolved effectively through non-lethal means. Additionally, lethal methods may not always be available for use due to safety concerns or local ordinances prohibiting the use of some lethal methods, such as the discharge of firearms.

3.4 MITIGATION AND STANDARD OPERATING PROCEDURES FOR WILDLIFE DAMAGE MANAGEMENT TECHNIQUES

3.4.1 Mitigation in Standard Operating Procedures (SOPs)

Mitigation measures are any features of an action that serve to prevent, reduce, or compensate for effects that otherwise might result from that action. The current WS program, nationwide and in Florida, uses such mitigation measures and these are discussed in detail in Chapter 5 of the ADC Final EIS (USDA 1997). Some key mitigating measures pertinent to the proposed action and alternatives of this EA that are also incorporated into WS SOPs include:

- The WS Decision Model thought process which is used to identify effective wildlife damage management strategies and their effects.
- Reasonable and prudent measures or alternatives are identified through consultation with the USFWS and are implemented to avoid effects to T&E species.
- EPA-approved label directions are followed for all pesticide use. The registration process for chemical pesticides is intended to assure minimal adverse effects to the environment when chemicals are used in accordance with label directions.
- All WS personnel in Florida using restricted chemicals and controlled substances (immobilization and euthanizing drugs) are trained and certified by, or operate under the direct supervision of, program personnel or others who are trained in the safe and effective use of chemical WDM materials. Management controls are in place within WS and it's I&E Committee to maintain personnel training and certification.
- Research is being conducted to improve WDM methods and strategies so as to increase selectivity for target species, to develop effective non-lethal control methods, and to evaluate non-target hazards and environmental effects.

3.4.2 Additional Mitigation Specific to the Issues

The following is a summary of additional mitigation measures that are specific to the issues listed in Chapter 2 of this document.

- Management actions would be directed toward localized populations or groups of target species and/or individual offending members of those species. Generalized population suppression across the State, or even across major portions of the State, would not be conducted.
- WS uses WDM devices and conducts activities for which the risk of hazards to public safety and hazard to the environment have been determined to be low according to a formal risk assessment (USDA 1997, Appendix P).
- WS personnel are trained and experienced to select the most appropriate method for taking problem animals and excluding non-target take.
- WS has consulted with the USFWS regarding potential effects of control methods on T&E species and abides by reasonable and prudent alternatives (RPAs) and/or reasonable and prudent measures (RPMs) established as a result of that consultation. For the full context of the Biological Opinion, see the ADC Final EIS, Appendix F (USDA 1997).
- WS has consulted with the FFWCC Endangered and Nongame Species Program regarding potential effects of wildlife damage management control methods on State-listed T&E species.

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

4.0 INTRODUCTION

Chapter 4 provides information needed for making informed decisions in selecting the appropriate alternative for meeting the purpose of the proposed action. This chapter analyzes the environmental consequences of each alternative in relation to the issues identified for detailed analysis in Chapter 2. This section analyzes the environmental consequences of each alternative in comparison with the no action alternative to determine if the real or potential effects would be greater, lesser, or the same.

The following resource values within the State are not expected to be significantly impacted by any of the alternatives analyzed: soils, geology, minerals, water quality/quantity, flood plains, wetlands, visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. These resources will not be analyzed further.

Cumulative Effects: Cumulative effects are discussed in relationship to each of the alternatives analyzed, with emphasis on potential cumulative effects from methods employed, and including summary analyses of potential cumulative impacts to target and non-target species, including T&E species.

Irreversible and Irretrievable Commitments of Resources: Other than minor uses of fuels for motor vehicles and other materials, there are no irreversible or irretrievable commitments of resources.

Effects on sites or resources protected under the National Historic Preservation Act: WS WDM actions are not undertakings that could adversely affect historic resources (See Section 1.1.5).

4.1 ENVIRONMENTAL CONSEQUENCES FOR ISSUES ANALYZED IN DETAIL

4.1.1 Effects on Target Wildlife Species

4.1.1.1 Alternative 1: Technical Assistance Only (No Action)

Under this alternative, WS would have no impact on target wildlife populations because the program would not provide any operational WDM activities. The program would be limited to providing advice only. However, the PBCPRD could conduct WDM using any legal lethal or non-lethal method available to them. For the same reasons shown below in the population effects analysis in section 4.1.1.2, it is unlikely that target wildlife populations would be adversely impacted by implementation of this alternative.

4.1.1.2 Alternative 2: Integrated Wildlife Damage Management Program (Proposed Action)

Analysis of this issue is limited to those species killed during WS WDM activities. The analysis for magnitude of impact generally follows the process described in Chapter 4 of USDA (1997). Magnitude is described in USDA (1997) as "... a measure of the number of animals killed in relation to their abundance." Magnitude may be determined either quantitatively or qualitatively. Quantitative determinations are based on population estimates, allowable harvest levels, and actual harvest data. Qualitative determinations are based on population trends and harvest data when available. Generally, WS only conducts damage management on species whose population densities are high and usually only after they have caused damage.

Raccoon

In Florida, there is no closed season on raccoons. Raccoons may be live-trapped, hunted with dogs, or taken with snares and guns year-round, with no daily limit. No license or permit is required to take nuisance raccoons. The transport of live raccoons is prohibited per FFWCC

regulation. The FFWCC considers raccoons to be a vector species for the raccoon rabies strain that is currently endemic in Florida.

Absolute raccoon population densities are difficult or impossible to determine because of the difficulty in knowing what percentage of the population has been counted or estimated and the additional difficulty of knowing how large an area the raccoons are using (Sanderson 1987). Due to their adaptability, raccoon densities are greater in urban areas than in rural areas. Relative raccoon population densities have been variously inferred by take of animals per unit area. For instance, Twichell and Dill (1949) reported removing 100 raccoons from tree dens in a 41 ha (101 acres) waterfowl refuge area, while Yeager and Rennels (1943) studied raccoons on 881 ha (2,177 acres) in Illinois and reported trapping 35-40 raccoons in 1938-39, 170 in 1939-40, and 60 in 1940-41. Slate (1980) estimated 1 raccoon/7.8 ha (19.3 acres) in New Jersey in predominantly agricultural land on the inner coastal plain. Raccoon densities of 100 per sq. mile (1 raccoon per 6.4 acres) can be attained around abundant food sources (Kern 2002). Kennedy et al. (1991) estimated 13 raccoons per 100 ha (1 raccoon per 19 acres) of lowland forest in Tennessee.

No population estimates were available for raccoons in Florida. Therefore the best available information was used to estimate minimum statewide population size for raccoons. The state of Florida is approximately 53,927 square miles (U.S. Census Bureau 1999). Raccoons are abundant across the state (T. Regan, pers.comm., September 2004). Using the assumption that raccoon densities across the state average 50 per sq. mile, a conservative (minimum) statewide raccoon population could be estimated at approximately 2,696,350 raccoons. Palm Beach county is approximately 1,974 square miles (U.S. Census Bureau 1999). Applying an assumed raccoon density of 50 per sq. mile, a conservative (minimum) raccoon population for Palm Beach county is approximately 98,700 raccoons.

Fur buyer reports from Florida show that 667 raccoons were harvested in the state during the 1998-1999 season. There has been no commercial harvest of raccoons in Florida since this time. Indices show that raccoon populations in Florida have been increasing since 1987 (K. Hodges, pers. comm., September 2004). In FY 2001, 2002 and 2003 cumulatively, the WS program lethally removed a total of 536 raccoons statewide from all damage management projects conducted by the WS program.

WS's lethal management of raccoons would be expected to be no more than approximately 500 animals in any one year under the proposed action. Based on the above information, FFWCC oversight, and WS limited lethal take of raccoons in Florida, WS should have minimal effects on local or statewide raccoon populations.

Virginia Opossum

In Florida, there is no closed season on opossums. Opossums may be live-trapped, hunted with dogs, or taken with snares and guns year-round, with no daily limit. No license or permit is required to take nuisance opossums. FFWCC regulation allows for the relocation of nuisance opossums with written landowner permission on the release site. Due to the rare occurrence of rabies in opossums, the FFWCC does not consider this species to be a rabies vector species.

Opossums use a home range consisting of 4-20 ha. (10-50 acres) in size (Jackson 1994, Seidensticker, et al. 1987). Opossums live for only 1-2 years, with as few as 8% of a population of these animals surviving into the second year in a Virginia study conducted by Seidensticker, et al. (1987). In this 5 year study, it was also observed that there was a wide variation in opossum numbers, in what was considered excellent habitat for the species. These variations were observed seasonally and in different years. However, the mean density during the study was 3.9/km² (10.1/mi²). This was comparable to other opossum population densities in similar habitats in Virginia.

No population estimates were available for opossums in Florida. Therefore the best available information was used to estimate minimum statewide population size for opossums. The state of Florida is approximately 53,927 square miles (U.S. Census Bureau 1999). Opossums are abundant across the state (T. Regan, pers.comm., September 2004). Using the assumption that opossum densities across the state average 10.1 per sq. mile, a conservative (minimum) statewide opossum population could be estimated at approximately 544,662 opossums. Palm Beach county is approximately 1,974 square miles (U.S. Census Bureau 1999). Applying an assumed opossum density of 10.1 per sq. mile, a conservative (minimum) opossum population for Palm Beach county is approximately 19,940 opossums.

Fur buyer reports from Florida show that 14 opossums were harvested in the state during the 1998-1999 season. There has been no commercial harvest of opossums in Florida since this time. Opossums are abundant in the state, with a stable population, but of unknown size (K. Hodges, pers. comm., September 2004). In FY 2001, 2002 and 2003 cumulatively, the WS program lethally removed a total of 14 opossums statewide from all damage management projects conducted by the WS program.

WS's lethal management of opossums would be expected to be no more than approximately 500 animals in any one year under the proposed action. Based on the above information, FFWCC oversight, and WS limited lethal take of opossums in Florida, WS should have minimal effects on local or statewide opossum populations.

Eastern Gray Squirrel

In Florida, gray squirrels are managed as a small game animal by FFWCC. Squirrel season runs from November 13 through March 6, with a bag limit of 12, and a possession limit of 24. Squirrels may be taken with all legal firearms including bows and arrows, muzzleloading guns, crossbows, and handguns. Landowners may lawfully live-trap or humanely destroy nuisance gray squirrels year-round, without a permit. A permit is required to transport live-trapped wildlife and landowner permission must be obtained before captive wildlife can be released on private land. Wildlife may not be lawfully relocated to public land.

Gray squirrels are found throughout most of the eastern U. S., including Florida. They inhabit mixed hardwood forests, especially those containing nut trees. Gray squirrels produce young during early spring (National Audubon Society 2000). Older adults of may produce two litters per year (Burt and Grossenheider 1964, Jackson, 1994b). The gestation period is 42-45 days, and about three young comprise a litter. Young begin to explore outside the nest at about 10-12 weeks of age (Jackson 1994b). Home ranges of squirrels range from 1.2 to over 40 acres in size (Flyger and Gates 1982). Squirrel populations periodically rise and fall, and during periods of high populations they may go on mass emigrations, during which time many animals die. Predation seems to have little effect on squirrel populations. Typically about half the squirrels in a population die each year and wild squirrels over 4 years old are rare, while captive individuals may live 10 years or more (Jackson 1994b).

No population estimates were available for gray squirrels in Florida. Therefore the best available information was used to estimate minimum statewide population size for gray squirrels. The state of Florida is approximately 53,927 square miles with approximately 15 million forested acres (U.S. Census Bureau 1999, Wear and Greis 2003). Gray squirrels are abundant across the state, with a stable population, but of unknown size (K. Hodges, pers.comm., September 2004). Using the assumption that 75% of the forested areas throughout the state have sufficient habitat to support squirrels, squirrel home ranges average 1 squirrel per 40 acres of forested habitat, and that home ranges do not overlap, a conservative statewide squirrel population could be estimated at over 281,000 squirrels. Palm Beach county is approximately 1,974 square miles with approximately 122,400 forested acres (U.S. Census Bureau 1999). Using the assumption that 75% of the forested areas throughout the county have sufficient habitat to support squirrels, squirrel

home ranges average 1 squirrel per 40 acres of forested habitat, and that home ranges do not overlap, a conservative gray squirrel population for Palm Beach county is approximately 2,300 squirrels.

In FY 2001, 2002, and 2003 cumulatively, the WS program reported no lethal removal of gray squirrels statewide from all damage management projects conducted by the WS program.

WS's lethal management of gray squirrels would be expected to be no more than approximately 100 animals in any one year under the proposed action. Based on the above information, FFWCC oversight, and WS limited lethal take of gray squirrels in Florida, WS should have minimal effects on local or statewide gray squirrel populations.

Gray Fox

In Florida, there is no open season on gray fox. Foxes may not be killed, but may be chased with dogs year-round. The possession of a gun while chasing fox is prohibited. Landowners may lawfully live-trap or humanely destroy nuisance gray foxes year-round, without a permit. A permit must be obtained from the FFWCC to utilize padded jaw traps to capture nuisance gray foxes. A permit is required to transport live-trapped wildlife and landowner permission must be obtained before captive wildlife can be released on private land. Wildlife may not be lawfully relocated to public land.

Home ranges for gray foxes vary throughout the year. Both males and females travel over larger areas during fall and winter, probably in response to increased energy demands and a declining food base (Follmann 1973, Nicholson 1982). During April, when young foxes require regular feeding, a female's home range is less extensive than it is without the demands of those young (Follman 1973). Although exceptions exist, eastern gray foxes generally have larger home ranges than western animals (Fritzell 1987). For instance, 16 adult foxes were tracked for more than 1 month in Alabama (Nicholson 1982) and Missouri (Haroldson and Fritzell 1984) and it was determined that they all had home ranges larger than 200 ha (500 acres), and many exceeded 500 ha (1,235 acres). Estimates of gray fox density vary from 1.2 - 2.1 / km² (3.1 - 5.4 / mi²) depending on location, season, and method of estimation (Errington 1933, Gier 1948, Lord 1961, Trapp 1978). Over areas larger than 5,000 km² (1,930 mi²) in which habitat quality varies, densities are likely lower. Exceptionally high fox densities have been recorded in some situations (Grinnell 1937, Hallberg and Trapp 1984).

No population estimates were available for gray foxes in Florida. Therefore the best available information was used to estimate minimum statewide population size for gray foxes. The state of Florida is approximately 53,927 square miles (U.S. Census Bureau 1999). Gray fox are abundant across the state, with a stable population, but of unknown size (K. Hodges, pers.comm., September 2004). Using the assumption that gray fox densities across the state average 3.1 per sq. mile, a conservative (minimum) statewide gray fox population could be estimated at approximately 167,175 gray fox. Palm Beach county is approximately 1,974 square miles (U.S. Census Bureau 1999). Applying an assumed gray fox density of 3.1 per sq. mile, a conservative (minimum) gray fox population for Palm Beach county is approximately 6,120 gray fox.

In FY 2001, 2002 and 2003 cumulatively, the WS program lethally removed a total of 20 gray fox statewide from all damage management projects conducted by the WS program.

WS's lethal management of gray fox would be expected to be no more than approximately 25 animals in any one year under the proposed action. Based on the above information, FFWCC oversight, and WS limited lethal take of gray fox in Florida, WS should have minimal effects on local or statewide gray fox populations.

Eastern Wood Rat and Hispid Cotton Rat

Eastern wood rats and hispid cotton rats are found throughout much of Florida (American Society of Mammalogists 2004) and are managed by the FFWCC as a nongame species.

Litter size of the eastern wood rat ranges from one to five with up to three litters being produced annually (Davis and Schmidly 1994). The gestation period is about 33 days. Wood rats do not reach adult size until they are about 8-9 months of age, and most females do not breed until they are about 1 year old. Their home range is rather limited; the animals usually stay close to the home den (Davis and Schmidly 1994). Studies suggest that 85 meters is an exceptional distance for them to travel in their foraging activities. Also, they are more or less colonial to the extent that several rats will establish themselves in a relatively restricted locality. For example, in one instance 35 to 50 rats lived in a 180 m distance along a favorable gully (Davis and Schmidly 1994). WS's lethal management of eastern wood rats would be expected to be no more than approximately 500 animals in any one year under the proposed action.

Cotton rats are prolific and produce several litters of two to 10 young, averaging about five liters a year (Davis and Schmidly 1994). Captive females have given birth to as many as nine litters a year. Data from wild-caught rats likewise indicate a nearly yearlong breeding season at least in the warmer parts of their range. The gestation period is approximately 27 days. Females frequently breed again immediately after giving birth. Sexual maturity is reached in about 40 days. WS's lethal management of hispid cotton rats would be expected to be no more than approximately 500 animals in any one year under the proposed action.

Impacts of WS management activities on these rodent populations would be minimal due to the species' relatively high reproductive rates and because rodent damage management activities would be conducted at specific local sites. Based on the above information, FFWCC oversight, and WS limited lethal take of eastern wood rats and hispid cotton rats in Florida, WS should have minimal effects on local or statewide populations.

Feral and Exotic (Non-native) Species

The FFWCC defines an exotic species as a species that was introduced into Florida by human activity and is free-ranging in an area to which it was not native in pre-Columbian times. The FFWCC considers coyotes, armadillos, feral dogs, feral cats, feral hogs, feral waterfowl, iguanas, monitor lizards, Norway rats, and black rats as exotic species and therefore are not protected by State laws and regulations. Their take by WS is in accordance with WS policy, and local laws and regulations. In addition, feral waterfowl are not protected by federal migratory bird laws or regulation.

Any WDM involving lethal control actions by WS for these above listed species would be restricted to isolated individual sites. In those cases where feral/exotic species are causing damage or are a nuisance and complete removal of the local population could be achieved, this would be considered a beneficial impact on the human environment since these species are not considered part of the native ecosystem. However, some individuals who experience aesthetic enjoyment of these exotic species may consider population reduction in some localities as a negative impact.

4.1.1.3 Alternative 3: Non-lethal Wildlife Damage Management Only by WS

Under this alternative, WS would not kill any target wildlife species because no lethal methods would be used. Although WS lethal take of animals would not occur, the PBCPRD could still resort to lethal methods that were available to them. For the same reasons shown in the population effects analysis in section 4.1.1.2, it is unlikely that target wildlife populations would be adversely impacted by implementation of this alternative.

4.1.1.4 Alternative 4: No Federal WS Wildlife Damage Management

Under this alternative, WS would have no impact on target wildlife populations. However, the PBCPRD could conduct WDM using any legal lethal or non-lethal method available to them. For the same reasons shown below in the population effects analysis in section 4.1.1.2, it is unlikely that target wildlife populations would be adversely impacted by implementation of this alternative.

4.1.2 Effects on Other Wildlife Species, including T&E Species

4.1.2.1 Alternative 1: Technical Assistance Only (No Action)

Under this alternative, WS would have no impact on non-target wildlife populations because the program would not provide any operational WDM activities. The program would be limited to providing advice only. However, the PBCPRD could conduct WDM using any legal lethal or non-lethal method available to them. Impacts to non-target species could be similar or greater than the proposed action dependent upon the skills and abilities of the person implementing control measures. Although technical support might lead to more selective use of control methods than that which might occur under Alternative 4, efforts to reduce or prevent depredations could still result in less experienced persons implementing control methods, leading to greater take of non-target wildlife than under the proposed action.

4.1.2.2 Alternative 2: Integrated Wildlife Damage Management Program (Proposed Action)

Effects on Non-target (non-T&E) Species. Direct impacts on nontarget species occur if WS program personnel were to inadvertently kill, injure, or harass animals that are not target species. In general, these impacts result from the use of methods that are not completely selective for target species. WS take of non-target species during WDM activities is expected to be extremely low to non-existent. If take of non-target species would occur, these occurrences are rare and should not affect the overall populations of any species. Mitigation measures designed and implemented to avoid adverse effects on non-target species are described in Chapter 3.

WS personnel are experienced and trained in wildlife identification, and to select the most appropriate methods for taking targeted animals and excluding non-target species. Non-target species are usually not affected by WS's non-lethal management methods, except for the occasional scaring from harassment devices. In these cases, affected non-target wildlife may temporarily leave the immediate vicinity of scaring, but would most likely return after conclusion of the action. Shooting is virtually 100% selective for the target species; therefore no adverse impacts are anticipated from use of this method. WS personnel use animal lures and set traps and snares in locations that are conducive to capturing target animals while minimizing potential impacts to non-target species. Any non-target species captured unharmed in a live trap would be subsequently released on site.

Any operational uses of WDM chemicals would be in accordance with labeling requirements under FIFRA and state pesticide laws and regulations that are established to avoid unreasonable adverse effects on the environment. Following labeling requirements and use restrictions are a built-in mitigation measure that would assure that use of registered chemical products would avoid significant adverse effects on non-target species populations. No adverse impacts from the use of chemical methods are anticipated. Based on a thorough Risk Assessment, APHIS concluded that, when WS program chemical methods are used in accordance with label directions, they are highly selective to target individuals or populations, and such use has negligible effects on the environment (USDA 1997).

<u>T&E Species Effects</u>. Special efforts are made to avoid jeopardizing T&E species through biological evaluations of the potential effects and the establishment of special restrictions or

mitigation measures. WS has consulted with the USFWS under Section 7 of the ESA concerning potential impacts of WDM methods on T&E species and has obtained a Biological Opinion. For the full context of the Biological Opinion, see Appendix F of the ADC Final EIS (USDA 1997, Appendix F).

For the preparation of this EA, WS obtained and reviewed the list of federally listed T&E species for the state of Florida (Appendix C) and determined that the proposed WS WDM program in Palm Beach county would have no effect on certain Federal T&E species (American alligator, purple bankclimber, gray bat, Schaus swallowtail butterfly, Audubon's crested caracara, whooping crane, American crocodile, Okaloosa darter, key deer, bald eagle, Florida scrub jay, Everglades snail kite, West Indian manatee, Gulf moccasinshell, Ochlockonee moccasinshell, Anastasia Island beach mouse, Choctawhatchee beach mouse, Key Largo cotton mouse, Perdido Key beach mouse, southeastern beach mouse, St. Andrew beach mouse, Florida Panther, oval pigtoe, piping plover, shinyrayed pocketbook, Lower Keys marsh rabbit, rice rat, flatwoods salamander, Squirrel Chimney Cave shrimp, bluetail mole skink, snad skink, Chipola slabshell, Stock Island tree snail, Atlantic salt marsh snake, eastern indigo snake, Cape Sable seaside sparrow, Florida grasshopper sparrow, wood stork, gulf sturgeon, shortnose sturgeon, roseate tern, fat three-ridge, Florida salt marsh vole, finback whale, humpback whale, right whale, red wolf, red-cockaded woodpecker, Key Largo wood rat, Crenulate lead-plant, four-petal pawpaw, Florida bonamia, Brooksville bellflower, fragrant prickly-apple, deltoid spurge, Garber's spurge, pygmy fringe-tree, Florida golden aster, Florida perforate cladonia, pigeon wings, short-leaved rosemary, Etonia rosemary, Apalachicola rosemary, Avon Park harebells, Okeechobee gourd, beautiful pawpaw, Rugel's pawpaw, Garrett's mint, longspurred mint, scrub mint, Lakela's mint, scrub buckwheat, snakeroot, telephus spurge, Small's milkpea, Johnson's seagrass, Harper's beauty, highlands scrub hypericum, beach jacquemontia, Cooley's water-willow, scrub blazingstar, scrub lupine, white birds-in-a-nest, Britton's beargrass, papery whitlow-wort, Key tree cactus, Godfrey's butterwort, Lewton's polygala, tiny polygala, wireweed, sandlace, scrub plum, Chapman rhododendron, Miccosukee gooseberry, American chaffseed, Florida skullcap, fringed campion, gentian pinkroot, Cooley's meadowrue, Florida torreya, wide-leaf warea, Carter's mustard, and Florida ziziphus). For sea turtles (green, hawksbill, Kemp's ridley, leatherback, and loggerhead) WS WDM programs under the Proposed Actions would be beneficial where conducted on beach areas. The USFWS concurs with all of these determinations (Appendix D).

WS has obtained and reviewed the list of Florida State T&E species, species of concern, and species of special interest (Appendix E). WS has determined, and the FFWCC has concurred, that the proposed WS WDM program is not likely to adversely impact any state listed endangered or threatened species (Appendix F).

Mitigation measures to avoid T&E effects are described in Chapter 3.

4.1.2.3 Alternative 3: Non-lethal Wildlife Damage Management Only by WS

Under this alternative, WS take of non-target animals would hypothetically be less than that of the proposed action because no lethal control actions would be taken by WS. Non-target species are usually not affected by WS's non-lethal management methods, except for the occasional scaring from harassment devices. In these cases, affected non-target wildlife may temporarily leave the immediate vicinity of scaring, but would most likely return after conclusion of the action. Impacts of WS use of non-lethal methods would be similar to the proposed action.

However, the PBCPRD could conduct lethal WDM using any method legally available to them. Impacts to non-target species could be similar or greater than the proposed action dependent upon the skills and abilities of the person implementing control measures. Efforts to reduce or prevent depredations could result in less experienced persons implementing control methods, leading to greater take of non-target wildlife than under the proposed action.

4.1.2.4 Alternative 4: No Federal WS Wildlife Damage Management

Under this alternative, WS would have no impact on non-target wildlife populations. However, the PBCPRD could conduct WDM using any legal lethal or non-lethal method available to them. Impacts to non-target species could be similar or greater than the proposed action dependent upon the skills and abilities of the person implementing control measures. Efforts to reduce or prevent depredations could result in less experienced persons implementing control methods, leading to greater take of non-target wildlife than under the proposed action.

4.1.3 Effects on Human Health and Safety

4.1.3.1 Safety and Efficacy of Chemical Control Methods

Alternative 1: Technical Assistance Only (No Action)

Under this alternative, concerns about human health risks from WS's use of chemical WDM methods would be alleviated because no such use would occur because the program would not provide any operational WDM activities. The program would be limited to providing advice only. However, the PBCPRD could conduct WDM using any chemical method legally available to them. Impacts could be similar or greater than the proposed action dependent upon the skills and abilities of the person implementing control measures. Although technical support might lead to more selective use of chemical methods than that which might occur under Alternative 4, efforts to reduce or prevent depredations could still result in less experienced persons implementing control methods, leading to greater risk than the proposed action alternative.

Alternative 2: Integrated Wildlife Damage Management Program (Proposed Action)

Chemical methods are used by WS personnel who are certified pesticide applicators, in accordance with label restrictions, and in a manner defined by application guidelines on the label. Based on a thorough Risk Assessment, APHIS concluded that, when WS Program chemical methods are used in accordance with label directions, they are highly selective to target individuals or populations, and such use has negligible effects on the environment (USDA 1997). Therefore, WS use of chemical methods is not expected to adversely affect human health or safety.

Drugs used in capturing, sedating, handling, and euthanizing wildlife for wildlife management purposes include ketamine hydrochloride, a mixture of tiletamine and zolazepam (Telazol), xylazine (Rompun), sodium pentobarbitol, potassium chloride, Yohimbine, antibiotics, and others. Meeting the requirements of the Animal Medicinal Drug Use Clarification Act (AMDUCA) should prevent any significant adverse impacts on human health and safety with regard to this issue. Mitigation measures that would be part of the standard operating procedures include:

- All drug use in capturing and handling wildlife would be under the direction and authority of state veterinary authorities, either directly or through procedures agreed upon between those authorities and APHIS-WS. As determined on a state-level basis by these veterinary authorities (as allowed by AMDUCA), wildlife hazard management programs may choose to avoid capture and handling activities that utilize immobilizing drugs within a specified number of days prior to the hunting or trapping season for the target species to avoid release of animals that may be consumed by hunters prior to the end of established withdrawal periods for the particular drugs used. Ear tagging or other marking of animals drugged and released to alert hunters and trappers that they should contact state officials before consuming the animal.
- Most animals administered drugs would be released well before state controlled hunting/trapping seasons which would give the drug time to completely metabolize out of

the animals' systems before they might be taken and consumed by humans. In some instances, animals collected for control purposes would be euthanized when they are captured within a certain specified time period prior to the legal hunting or trapping season to avoid the chance that they would be consumed as food while still potentially having immobilizing drugs in their systems.

By following these procedures in accordance with AMDUCA, wildlife management programs would avoid any significant impacts on human health and safety with regard to this issue.

Alternative 3: Non-lethal Wildlife Damage Management Only by WS

Under this alternative, WS could use and recommend the use of non-lethal chemical methods. Impacts from WS use of these chemicals would be similar to those described under the proposed action.

The PBCPRD could conduct WDM using any chemical method legally available to them. Impacts could be similar or greater than the proposed action dependent upon the skills and abilities of the person implementing control measures.

Alternative 4: No Federal WS Wildlife Damage Management

Under this alternative, concerns about human health risks from WS's use of chemical WDM methods would be alleviated because no such use would occur. However, the PBCPRD could conduct WDM using any chemical method legally available to them. Impacts could be similar or greater than the proposed action dependent upon the skills and abilities of the person implementing control measures. Efforts to reduce or prevent depredations could result in less experienced persons implementing control methods, leading to greater risk than the proposed action alternative.

4.1.3.2 Impacts on Human Safety of Non-chemical WDM Methods

Alternative 1: Technical Assistance Only (No Action)

Under this alternative, WS would not engage in direct operational use of any non-chemical WDM methods. Risks to human safety from WS's use of firearms, traps, snares, and pyrotechnics would hypothetically be lower than the proposed action alternative, since WS would not be conducting direct control activities. The PBCPRD could conduct WDM using any non-chemical method legally available to them. Impacts could be similar or greater than the proposed action dependent upon the skills and abilities of the person implementing control measures. Hazards to humans could be greater under this alternative if personnel conducting WDM activities using non-chemical methods are poorly or improperly trained.

Alternative 2: Integrated Wildlife Damage Management Program (Proposed Action)

Non-chemical MDM methods that might raise safety concerns include shooting with firearms, use of traps and snares, and harassment with pyrotechnics. Firearms, traps, snares, and pyrotechnics are only used by WS personnel who are experienced in handling and using them. WS personnel receive safety training on a periodic basis to keep them aware of safety concerns. The Florida WS program has had no accidents involving the use of firearms, traps, snares, or pyrotechnics in which any person was harmed. A formal risk assessment of WS's operational management methods found that risks to human safety were low (USDA 1997, Appendix P). Therefore, no adverse affects on human safety from WS's use of these methods is expected.

Alternative 3: Non-lethal Wildlife Damage Management Only by WS

Under this alternative, non-chemical WDM methods that might raise safety concerns include shooting with firearms when used as a harassment technique, traps, snares, and harassment with pyrotechnics. Impacts from WS use of these methods would be similar to those described under the proposed action alternative.

Alternative 4: No Federal WS Wildlife Damage Management

Under this alternative, concerns about human safety risks from WS's use of non-chemical WDM methods would be alleviated because no such use would occur. The PBCPRD could conduct WDM using any non-chemical method legally available to them. Impacts could be similar or greater than the proposed action dependent upon the skills and abilities of the person implementing control measures. Hazards to humans could be greater under this alternative if personnel conducting WDM activities using non-chemical methods are poorly or improperly trained.

4.1.3.3 Impacts on Human Health and Safety from Wildlife

Alternative 1: Technical Assistance Only (No Action)

With WS technical assistance but no direct management, the PBCPRD would either take no action, which means the risk of human health problems would likely continue or increase in each situation as wildlife numbers are maintained or increased, or implement WS recommendations for non-lethal and lethal control methods. Potential impacts would be variable dependent upon the skills and abilities of the person implementing control measures. Although technical support might lead to more selective use of control methods than that which might occur under Alternative 4, individuals that implement management actions may or may not have the experience necessary to efficiently and effectively conduct an effective WDM program.

Alternative 2: Integrated Wildlife Damage Management Program (Proposed Action)

Some people are concerned with potential injury, illness, and loss of human life resulting from injurious wildlife species. An IWDM strategy, a combination of lethal and non-lethal means, has the greatest potential of successfully reducing this risk. All WDM methods could possibly be implemented and recommended by WS.

An IWDM approach reduces damage or threats to human health or safety for people who would have no relief from such damage or threats if non-lethal methods were ineffective or impractical. As discussed in Chapter 1, wild animals can carry or transmit diseases to humans. In most cases, it is difficult to conclusively prove that wild animals were responsible for transmission of individual human cases or outbreaks of wildlife-borne diseases. Nonetheless, the PBCPRD may consider this risk to be unacceptable and may request such service primarily for that reason. In such cases, WDM, either by lethal or non-lethal means, would reduce the risk of wildlife-borne disease transmission at the site for which WS assistance is requested.

In some situations the implementation of non-lethal controls such as harassment could actually increase the risk of human health problems at other sites by causing the animals to move to other sites not previously affected. In such cases, lethal removal may actually be the best alternative from the standpoint of overall human health concerns in the local area. If WS is providing direct operational assistance in relocating animals, coordination with local authorities may be conducted to assure they do not reestablish in other undesirable locations.

Alternative 3: Non-lethal Wildlife Damage Management Only by WS

Under this alternative, WS would be restricted to implementing and recommending only non-lethal methods in providing assistance with wildlife damage problems. The success or failure of non-lethal methods can be quite variable. In some situations the implementation of non-lethal controls such as harassment could actually increase the risk of human health problems at other sites by causing the animals to move to other sites not previously affected. However, if WS is providing direct operational assistance in relocating animals, coordination with local authorities may be conducted to assure they do not re-establish in other undesirable locations.

Even though WS would not conduct lethal control under this alternative, the PBCPRD could implement lethal control methods that are available to them. Potential impacts would be variable dependent upon the skills and abilities of the person implementing control measures. Individuals that implement lethal management actions may or may not have the experience necessary to efficiently and effectively conduct an effective WDM program.

Alternative 4: No Federal WS Wildlife Damage Management

With no WS WDM program, the PBCPRD would either take no action, which means the risk of human health problems would likely continue or increase in each situation as wildlife numbers are maintained or increased, or implement their own WDM program. Potential impacts would be variable dependent upon the skills and abilities of the person implementing control measures. Individuals that implement management actions may or may not have the experience necessary to efficiently and effectively conduct an effective WDM program.

4.1.4 Impacts to Stakeholders, including Aesthetics

4.1.4.1 Effects on Human Affectionate Bonds with Individual Animals and on Aesthetic Values of Wildlife Species

Alternative 1: Technical Assistance Only (No Action)

Under this alternative, WS would not conduct any direct operational WDM, but would still provide technical assistance or self-help advice. Those who oppose direct operational assistance in wildlife damage management by the government, but favor government technical assistance, would favor this alternative. Persons who have developed affectionate bonds with individual wild animals would not be affected by WS's activities under this alternative because this individual animal would not be affected by WS. However, the PBCPRD would likely conduct WDM activities similar to those that would no longer be conducted by WS, which means the effects would then be similar to the proposed action alternative.

Alternative 2: Integrated Wildlife Damage Management Program (Proposed Action)

Those who routinely view or feed individual animals would likely be disturbed by removal of such animals under the proposed action. WS is aware of such concerns and takes these concerns into consideration to mitigate effects. WS may be able to mitigate such concerns by leaving certain animals that have been identified by interested individuals.

Some members of the public have expressed opposition to the killing of any animals during WDM activities. Under this alternative, some lethal control of animals would occur and these persons would be opposed. However, many persons who voice opposition have no direct connection or opportunity to view or enjoy the particular animals that would be killed by WS's lethal control activities. Lethal control actions would generally be restricted to local sites and to small, unsubstantial percentages of overall populations. Therefore, the species subjected to limited lethal control actions would remain common and abundant and would, therefore, continue to remain available for viewing by persons with that interest.

Alternative 3: Non-lethal Wildlife Damage Management Only by WS

Under this alternative, WS would not conduct any lethal WDM activities. Some people who oppose lethal control of wildlife by the government, but are tolerant of government involvement in non-lethal wildlife damage management would favor this alternative. Persons who have developed affectionate bonds with individual wild animals would not be affected by the death of the individual under this alternative, but might oppose dispersal or translocation of these animals. WS may be able to mitigate such concerns by leaving certain animals that have been identified by interested individuals.

Although WS would not perform any lethal activities under this alternative, the PBCPRD would likely conduct WDM activities similar to those that would no longer be conducted by WS, which means the effects would then be similar to the proposed action alternative.

Alternative 4: No Federal WS Wildlife Damage Management

Under this alternative, WS would not conduct any WDM activities. Those in opposition of any government involvement in wildlife damage management would favor this alternative. Persons who have developed affectionate bonds with individual wild animals would not be affected by WS's activities under this alternative. However, the PBCPRD would likely conduct WDM activities similar to those that would no longer be conducted by WS, which means the effects would then be similar to the proposed action alternative.

4.1.4.2 Effects On Aesthetic Values of Property Damaged by Wildlife

Alternative 1: Technical Assistance Only (No Action)

With WS technical assistance but no direct management, the PBCPRD would either take no action, which means damage would likely continue or increase in each situation as wildlife numbers are maintained or increased, or implement WS recommendations for non-lethal and lethal control methods. Potential impacts would be variable dependent upon the skills and abilities of the person implementing control measures. Although technical support might lead to more selective use of control methods than that which might occur under Alternative 4, individuals that implement management actions may or may not have the experience necessary to efficiently and effectively conduct an effective WDM program.

Alternative 2: Integrated Wildlife Damage Management Program (Proposed Action)

An IWDM strategy, a combination of lethal and non-lethal means, has the greatest potential of successfully reducing wildlife damage. All WDM methods could possibly be implemented and recommended by WS.

In some situations the implementation of non-lethal controls such as harassment could actually increase the risk of damage at other sites by causing the animals to move to other sites not previously affected. In such cases, lethal removal may actually be the best alternative from the standpoint of reducing overall damage in the local area. If WS is providing direct operational assistance in relocating animals, coordination with local authorities may be conducted to assure they do not reestablish in other undesirable locations.

Alternative 3: Non-lethal Wildlife Damage Management Only by WS

Under this alternative, WS would be restricted to implementing and recommending only non-lethal methods in providing assistance with wildlife damage problems. The success or failure of non-lethal methods can be quite variable. In some situations the implementation of non-lethal controls such as harassment could actually increase the risk of damage at other sites by causing the

animals to move to other sites not previously affected. However, if WS is providing direct operational assistance in relocating animals, coordination with local authorities may be conducted to assure they do not re-establish in other undesirable locations.

Even though WS would not conduct lethal control under this alternative, the PBCPRD could implement lethal control methods that are available to them. Potential impacts would be variable dependent upon the skills and abilities of the person implementing control measures. Individuals that implement lethal management actions may or may not have the experience necessary to efficiently and effectively conduct an effective WDM program.

Alternative 4: No Federal WS Wildlife Damage Management

With no WS WDM program, the PBCPRD would either take no action, which means wildlife damage would likely continue or increase in each situation as wildlife numbers are maintained or increased, or implement their own WDM program. Potential impacts would be variable dependent upon the skills and abilities of the person implementing control measures. Individuals that implement management actions may or may not have the experience necessary to efficiently and effectively conduct an effective WDM program.

4.1.5 Humaneness and Animal Welfare Concerns of Methods Used

4.1.5.1 Alternative 1: Technical Assistance Only (No Action)

Under this alternative, WS would not conduct any direct operational WDM, but would still provide technical assistance or self-help advice. Lethal methods viewed as inhumane by some persons would not be used by WS. The PBCPRD could use the information provided by WS or implement their own damage reduction program without WS technical assistance. Many of the methods considered inhumane by some individuals and groups might still be used by the PBCPRD, which means the effects would then be similar to the proposed action alternative.

4.1.5.2 Alternative 2: Integrated Wildlife Damage Management Program (Proposed Action)

WS personnel are experienced, professional and humane in their use of management methods. Under this alternative, animals would be captured and killed by experienced WS personnel using the best and most appropriate method(s) available. WDM methods viewed by some persons as inhumane would be employed by WS under this alternative. These methods would include shooting, trapping, chemical methods, cervical dislocation, and snares. Some individuals may perceive these methods as inhumane because they oppose all lethal methods of damage management.

Despite SOP's designed to maximize humaneness, the perceived stress and trauma associated with being held in a trap or snare until the WS employee arrives at the capture site to dispatch or release the animal, is unacceptable to some persons. Other WDM methods used to take target animals including shooting and body-gripping traps (i.e., Conibear) result in a relatively humane death because the animals die instantly or within seconds to a few minutes. These methods however, are also considered inhumane by some individuals. WS uses EPA registered and approved pesticides, and immobilization and euthanizing drugs. Some individuals consider the use of such chemicals to be inhumane. CO₂ and cervical dislocation are sometimes used to euthanize animals. CO₂ and cervical dislocation are recognized by the AVMA as an approved and humane euthanasia method to kill animals (AVMA 2001).

WS has improved the selectivity and humaneness of management techniques through research and development. Research is continuing to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur

when some WDM methods are used in situations where nonlethal damage management methods are not practical or effective.

4.1.5.3 Alternative 3: Non-lethal Wildlife Damage Management Only by WS

Under this alternative, lethal methods viewed as inhumane by some persons would not be used by WS. Although WS would not perform any lethal activities under this alternative, the PBCPRD would likely conduct lethal WDM activities similar to those that would no longer be conducted by WS, resulting in impacts similar to the proposed action alternative.

4.1.5.4 Alternative 4: No Federal WS Wildlife Damage Management

Under this alternative, WDM methods viewed as inhumane by some persons would not be used by WS. Although WS would not perform any management activities under this alternative, the PBCPRD would likely conduct WDM activities similar to those that would no longer be conducted by WS, resulting in impacts similar to the proposed action alternative.

4.2 CUMULATIVE IMPACTS

Cumulative impacts, as defined by CEQ (40 CFR 1508.7), are impacts to the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts may result from individually minor, but collectively significant, actions taking place over time.

Cumulative Impacts on Wildlife Populations

Wildlife damage management methods used or recommended by the WS program will likely have no cumulative adverse effects on target and non-target wildlife populations. WS limited lethal take of target wildlife species is anticipated to have minimal impacts on target species populations in Florida. When control actions are implemented by WS the potential lethal take of non-target wildlife species is expected to be minimal to non-existent.

Cumulative Impact Potential from Chemical Components

Chemical methods, such as repellents, may be used or recommended by WS. Characteristics of these chemicals and use patterns indicate that no significant cumulative impacts related to environmental fate are expected from their use in WS WDM programs.

Cumulative Impact Potential from Non-chemical Components

Non-chemical methods used or recommended by WS may include exclusion through use of various barriers, habitat modification of structures or vegetation, live trapping and relocation or euthanasia of animals, harassment of animals, trapping, snaring, and shooting. No cumulative impacts from WS use of these methods are expected, since take of native wildlife species would be authorized and/or permitted with FFWCC oversight.

SUMMARY

No significant cumulative environmental impacts are expected from any of the 4 alternatives. Under the proposed action, the lethal removal of animals by WS would not have significant impacts on overall target species populations in Florida, but some local reductions may occur. No risk to human safety is expected when WS's services are provided and accepted by requesting individuals in Alternatives 1, 2, and 3, since only trained and experienced wildlife biologists/specialists would conduct and recommend WDM activities. Although some persons will likely be opposed to WS's participation in WDM activities on

properties owned and managed by PBCPRD, the analysis in this EA indicates that WS IWDM program will not result in significant cumulative adverse impacts on the quality of the human environment. Table 4-1 summarizes the expected impact of each of the alternatives on each of the issues.

Table 4-1. Summary of Potential Impacts.

Issue/Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Technical Assistance Only (No Action)	Integrated Wildlife Damage Management Program (Proposed Action)	Nonlethal WDM Only by WS	No Federal WS WDM
Effects on Target Wildlife Species	No effect by WS. Low effect - reductions in local target species numbers by PBCPRD likely; would not significantly affect local or state populations.	Low effect - reductions in local target species numbers; would not significantly affect local or state populations	No effect by WS. Low effect - reductions in local target species numbers by PBCPRD likely; would not significantly affect local or state populations.	No effect by WS. Low effect - reductions in local target species numbers by PBCPRD likely; would not significantly affect local or state populations.
Effects on Other Wildlife Species, Including T&E Species	No effect by WS. Impacts by PBCPRD personnel would be variable.	Low effect - methods used by WS would be highly selective with very little risk to non- target species.	Low effect - methods used by WS would be highly selective with very little risk to non- target species.	No effect by WS. Impacts by PBCPRD personnel would be variable.
Effects on Human Health and Safety	Efforts by PBCPRD personnel to reduce or prevent conflicts could result in less experienced persons implementing control methods, leading to a greater potential of not reducing damage to the level of the proposed action.	The proposed action has the greatest potential of successfully reducing this risk. Low risk from methods used by WS.	Impacts could be greater under this alternative than the proposed action. Low risk from methods used by WS.	Efforts by PBCPRD personnel to reduce or prevent conflicts could result in less experienced persons implementing control methods, leading to a greater potential of of not reducing damage.
Effects on Human Affectionate Bonds and Aesthetic Values of Wildlife Species	Low to moderate effect. Local wildlife numbers in damage situations would remain high or possibly increase unless PBCPRD personnel successfully implement WDM methods; would not significantly affect local or state target species populations.	Low to moderate effect at local levels; Some local target species populations may be reduced; would not significantly affect local or state target species populations.	Low to moderate effect. Local wildlife numbers in damage situations would remain high or possibly increase when non-lethal methods are ineffective unless PBCPRD personnel successfully implement lethal methods; would not significantly affect local or state target species populations.	Low to moderate effect. Local wildlife numbers in damage situations would remain high or possibly increase unless PBCPRD personnel successfully implement WDM methods; would not significantly affect local or state target species populations.

Effects on Aesthetic Values of Property Damaged by Wildlife	Moderate to High effect – wildlife damage may not be reduced to acceptable levels; animals may move to other sites which can create damage problems at new sites.	Low effect – wildlife damage problems most likely to be resolved without creating or moving problems elsewhere.	Moderate to High effect – wildlife damage may not be reduced to acceptable levels; animals may move to other sites which can create damage problems at new sites.	High effect - wildlife problems less likely to be resolved without WS involvement. Animals may move to other sites which can create damage problems at new sites
Humaneness and Animal Welfare Concerns of Methods Used	No effect by WS. Impacts by PBCPRD personnel would be variable.	Low to moderate effect - methods viewed by some people as inhumane would be used by WS.	Lower effect than Alt. 2 since only non-lethal methods would be used by WS. Impacts by PBCPRD personnel would be variable.	No effect by WS. Impacts by PBCPRD personnel would be variable.

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Appendix A

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Appendix B

WILDLIFE DAMAGE MANAGEMENT (WDM) METHODS AVAILABLE FOR USE OR RECOMMENDATIONS BY THE USDA/WILDLIFE SERVICES PROGRAM

Resource owners and government agencies use a variety of techniques as part of integrated wildlife damage management programs. All lethal and non-lethal methods have limitations based on costs, logistics, practicality, or effectiveness. Wildlife damage management methods currently available to the Florida WS program are described here. If other methods are proven effective and legal to use in Florida, they could be incorporated into the Florida WS program, pursuant to permits, other authorizations, agreements with landowners, NEPA compliance, and other laws, regulations, and policies.

Nonchemical Wildlife Damage Management Methods

Nonchemical management methods consist primarily of tools or devices used to repel, capture or kill a particular animal or local population of wildlife to alleviate resource damage. Methods may be non-lethal (e.g., fencing, frightening devices, etc.) or lethal (e.g., firearms, Conibear traps, snares, etc.). Nonchemical methods used by WS include:

Exclusion pertains to preventing access to resources through fencing or other barriers. Fencing of small critical areas can sometimes prevent animals which cannot climb from entering areas of protected resources. Fencing, especially if it is installed with an underground skirt, can prevent access to areas for many mammal species which dig, including coyotes, foxes, dogs, and feral hogs. Hardware cloth or other metal barriers can sometimes be used to prevent the entry of animals into buildings through existing holes or gaps. Electric fences of various constructions have been used effectively to reduce damage by raccoons, and other species (Hygnstrom and Craven 1994, Boggess 1994). Lawn furniture/ornaments, vehicles, boats, snow fencing, plastic hazard fencing, metal wire fencing, and multiple strand fencing have all been used to limit the movement of waterfowl. The application of this method is limited to areas that can be completely enclosed and do not allow waterfowl to land inside enclosures. Similar to most abatement techniques, this method has been most effective when dealing with small numbers of breeding waterfowl and their flightless young along wetlands and/or waterways.

Cultural Methods and Habitat Management includes the application of practices which seek to minimize exposure of the protected resource to damaging animals through processes other than exclusion. Wildlife production and/or presence are directly related to the type, quality and quantity of suitable habitat. Therefore, habitat can be managed to reduce or eliminate the production or attraction of certain wildlife species. Strategies may include minimizing cover where damaging animals might hide, manipulating the surrounding environment through barriers or fences to deter animals from entering a protected area, and removal of trees from around buildings to reduce access by opossums and raccoons.

Some animals which cause damage are attracted to the presence of garbage or other food materials (i.e. food at campsites) left outside and unprotected. Removal or sealing of garbage in tight trash receptacles, and elimination of attractive foods from outside areas can reduce the presence of unwanted animals. If raccoons and opossums are a problem, making trash and garbage unavailable and removing attractive food sources from outside during nighttime hours can reduce their presence.

Habitat alteration can be the planting of vegetation unpalatable to wildlife or altering the physical habitat (Conover and Kania 1991, Conover 1992). Planting less preferred plants or grasses to discourage geese from a specific area could work more effectively if good alternative feeding sites are nearby (Conover 1985). However, the manipulation of turf grass varieties in urban/suburban, heavy use situations such as parks, athletic fields and golf courses is often not feasible. Fences, hedges, shrubs, boulders, etc. can be placed at shorelines to

impede waterfowl movements. Restricting a bird's ability to move between water and land will deter them from an area, especially during molts (Gosser et al. 1997).

Modify Human Behavior: Artificial feeding of waterfowl by people attracts and sustains more birds in an area than could be supported by natural food supplies. This unnatural food source exacerbates damage by waterfowl. The elimination of feeding of waterfowl is a primary recommendation made by WS, and many local municipalities and homeowners associations have adopted policies and ordinances prohibiting it. Some parks have posted signs, and there have been efforts made to educate the public on the negative aspects of feeding waterfowl. However, sometimes people do not comply, and the policies are poorly enforced in some areas.

Animal behavior modification refers to tactics that deter or repel damaging animals. These techniques are usually aimed at causing target animals to respond by fleeing from the site or remaining at a distance (Twedt and Glahn 1982). They usually employ extreme noise or visual stimuli. Unfortunately, many of these techniques are only effective for a short time before wildlife habituate to them (Conover 1982). Devices used to modify behavior in animals include:

- propane exploders
- pyrotechnics
- distress calls and sound producing devices
- laser lights
- human effigies

Lasers are a non-lethal technique recently evaluated by the USDA, APHIS, WS, National Wildlife Research Center (NWRC). Blackwell et al. (2002) tested lasers on several bird species and observed varied results among species. Lasers were ineffective at dispersing pigeons and mallard with birds habituating in approximately 5 minutes and 20 minutes, respectively (Blackwell et al. 2002). Canada geese reacted to the laser displaying neophobic avoidance to the approaching laser beam.

Dogs can be effective at harassing waterfowl and keeping them off turf and beaches (Conover and Chasko 1985, Castelli and Sleggs 2000). Around water, this technique appears most effective when the body of water to be patrolled is less than two acres in size (Swift 1998). Although dogs can be effective in keeping waterfowl off individual properties, they do not contribute to a solution for the larger problem of overabundant waterfowl populations (Castelli and Sleggs 2000). Swift (1998) and numerous individuals in New Jersey have reported that when harassment with dogs ceases, the number of geese return to pre-treatment numbers. WS has recommended and encouraged the use of dogs where appropriate.

Live Capture and Relocation can be used for the purpose of relocating animals for release to wild sites or for delivery to animal control officers/shelters in certain situations. WS sometimes uses this method when the target animal(s) can legally be relocated or can be captured and handled by WS personnel with relative safety. Live capture and handling of wild animals poses an additional level of human health and safety threat if target animals are aggressive, large, or extremely sensitive to the close proximity of humans. For that reason, WS may limit this method to specific situations and certain species. Excessive populations may make this a poor wildlife management strategy for some species. In addition, moving damage-causing individuals to other locations can typically result in damage at the new location, or the relocated individuals can move from the relocation site to areas where they are unwanted. Translocation of wildlife is also discouraged by WS policy (WS Directive 2.501) because of stress to the relocated animal, poor survival rates, and difficulties in adapting to new locations or habitats. The American Veterinary Medical Association, the National Association of State Public Health Veterinarians, and the Council of State and Territorial Epidemiologists all oppose the relocation of mammals because of the risk of disease transmission, particularly for small mammals such as raccoons (CDC 1990). In Florida, relocation of wildlife is regulated by the FFWCC.

Nest destruction is the removal of nesting materials during the construction phase of the nesting cycle. Nest destruction is generally only applied when dealing with a single bird or very few birds. This method is used to

discourage birds from constructing nests in areas which may create nuisances for resource owners. Heusmann and Bellville (1978) reported that nest removal was an effective but time-consuming method because problem bird species are highly mobile and can easily return to damage sites from long distances, or because of high populations.

Egg addling/destruction is a method of suppressing reproduction in local nuisance bird populations by destroying egg embryos prior to hatching. Egg addling is conducted by vigorously shaking an egg numerous times which causes detachment of the embryo from the egg sac. Egg destruction can be accomplished in several different ways, but the most commonly used methods are manually gathering eggs and breaking them, or by oiling or spraying the eggs with a liquid which covers the entire egg and prevents the egg from obtaining oxygen (see Egg oiling below). Although WS does not commonly use egg addling or destruction, it is a valuable damage management tool and has shown to be effective.

Trapping can utilize a number of devices, including small rodent (mouse, rat) snap traps, leg-hold traps, snares, cage traps, Conibear (body-gripping) traps, panel nets, rocket nets, clover traps, decoy traps, hand nets, etc. For a description of these methods the reader is referred to the FEIS, Appendix J (USDA 1997). These techniques are usually implemented by WS personnel because of the technical training required to use such devices. Below is a brief summary of capture devices available for WS use and recommendation in Florida.

Small Rodent Snap Traps are typically used by WS in FL to take field mice and other small rodents and insectivores. Snap traps are frequently used to remove house mice and rats from buildings, including barns. Their use to control rats and mice does not require permits, although their use to take field mice and insectivores does require a Scientific Collecting permit issued by the FFWCC. Snap traps may prove effective in lethal removal of rats and iguanas on certain PBCPRD properties.

Snares are capture devices comprised of a cable formed in a loop with a locking device and placed in travel ways. When the target species walks into the snare the loop becomes smaller in size, holding the animal as if it were on a leash. Most snares are also equipped with a swivel to minimize cable twisting and breakage.

Leg-hold traps are traps that come in a variety of sizes that allows the traps to be species specific of some degree. These traps are used for both mammals and birds and can be set on land or in water. The traps are made of steel with springs to close the trap around the foot and leg of the target species. These traps may have steel or padded bars, which hold the animal.

Cage traps are live capture traps used to trap a variety of small to medium sized mammals. Cage traps come in a variety of sizes. They are made of galvanized wire mesh, and contain a treadle in the middle of the cage that triggers the door to close behind the animal being trapped. Animals caught in cage traps may be relocated to other field locations, delivered to local animal control officers or shelters (dogs, cats), or euthanized according to AVMA-approved methods, including shooting, carbon dioxide, and euthanasia drugs.

Sherman box traps are small live traps used to capture small mammals such as rodents. These traps are often made of galvanized steel or aluminum and fold up for easy transport. Sherman box traps also consist of a treadle towards the back of the trap that triggers the door to close behind the animal being trapped.

Clover and traps are enclosure traps made of nylon netting or hardware cloth and come in many different sizes and designs, depending on the species of birds being captured. The entrance of the traps also vary greatly from swinging-door, one-way door, funnel entrance, to tip-top sliding doors. Traps are baited with grains or other food material which attract the target birds. Active traps are checked daily, every other day, or as appropriate, to replenish bait and water and to remove captured birds.

Decoy traps are used by WS for preventive and corrective damage management. Live decoy birds of the same species that are being targeted are usually placed in the trap with sufficient food and water to assure their survival. Feeding behavior and calls of the decoy birds attract other birds which

enter and become trapped themselves. Active decoy traps are monitored daily, every other day, or as appropriate, to remove excess birds and to replenish bait and water.

Panel nets as described by Costanzo et al. (1995) are lightweight, portable panels (approximate size 4' x 10') that are used to herd and surround flightless geese into a moveable catch pen. This method is equally efficient on hard (pavement) and soft (field) surfaces, and can be employed in such as way as to reduce stress on captured birds (place the catch pen in a shaded area) and control other impacts (place far from roadways).

Cannon nets are used for larger birds such feral ducks and waterfowl, and use mortar projectiles to propel a net up and over birds which have been baited to a particular site. This type of net is especially effective for waterfowl that are flightless due to molting and other birds which are typically shy to other types of capture.

Bow nets are small circular net traps used for capturing birds and small mammals. The nets are hinged and spring loaded so that when the trap is set it resembles a half moon. The net is set over a food source and it triggered by an observer using a pull cord.

Hand nets are used to catch birds and small mammals in confined areas. These nets resemble fishing dip nets with the exception that they are larger and have long handles.

Net guns are devices used to trap birds and mammals. The devices project a net over at target using a specialized gun.

Shooting is selective for target species and may involve the use of a handgun, shotgun or rifle. It is selective for target species and may be used in conjunction with the use of spotlights, decoys, and calling. Shooting is an effective method to remove a small number of animals in damage situations. Removal of specific animals in the problem area can sometimes provide immediate relief from a problem. Shooting is sometimes utilized as one of the first lethal damage management options because it offers the potential of resolving a problem more quickly and selectively than some other methods, but it is not always effective. Shooting may sometimes be one of the only damage management options available if other factors preclude setting of damage management equipment.

Firearm use may be a sensitive public concern because of issues relating to public safety. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards (WS Directive 2.615). WS employees who carry firearms as a condition of employment are required to sign a form certifying that they meet the criteria as stated in the Lautenberg Amendment which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence.

Hunting/Trapping. In certain situations, WS recommends that resource owners consider legal hunting and trapping as an option for reducing wildlife damage. Although legal hunting/trapping is impractical and/or prohibited in many urban-suburban areas, it can be used in certain circumstances. Hunting/trapping is recommended as a damage management tool wherever it is safe and legal, and would contribute to the effectiveness of an integrated management program.

Cervical Dislocation is sometimes used to euthanize small birds which are live captured and when relocation is not a feasible option. The bird is stretched and the neck is hyper-extended and dorsally twisted to separate the first cervical vertebrae from the skull. The AVMA approves this technique as humane method of euthanasia and states that cervical dislocation when properly executed is a humane technique for euthanasia of small rodents, poultry and other small birds (Beaver et al 2001). Cervical dislocation is a technique that may induce rapid unconsciousness, does not chemically contaminate tissue, and is rapidly accomplished (Beaver et al 2001).

Chemical Wildlife Damage Management Methods

Some chemicals used by WS are registered as required by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (administered by the EPA and the Florida Department of Agriculture and Consumer Services Division of Agricultural Environmental Services Bureau of Pesticides), or by the FDA. WS personnel that use restricted-use chemical methods are certified as pesticide applicators by the Florida Department of Agriculture and Consumer Services Division of Agricultural Environmental Services Bureau of Pesticides, and are required to adhere to all certification requirements set forth in FIFRA and Florida pesticide control laws and regulations. In addition, certain anesthesia and euthanasia drugs are administered in accordance with DEA regulations. Chemical methods are only used at sites with authorization from the property owner/manager. The following chemical methods have been proven to be selective and effective in reducing damage by wildlife.

Egg oiling is method of suppressing reproduction of nuisance birds by spraying a small quantity of mineral oil or food grade corn oil on eggs in nests. The oil prevents exchange of gases and causes asphyxiation of developing embryos and has been found to be 96-100% effective in reducing hatchability. (Pochop 1998; Pochop et al. 1998). The method has an advantage over nest or egg destruction in that the incubating birds generally continue incubation and do not re-nest. The EPA has ruled that use of corn oil for this purpose is exempt from registration requirements under FIFRA. To be most effective, the oil should be applied anytime between the fifth day after the laying of the last egg in a nest and at least five days before anticipated hatching. This method is extremely target specific and is less labor intensive than egg addling.

CO₂ is sometimes used to euthanize animals which are live captured and when relocation is not a feasible option. Live animals are placed in a chamber which is then sealed shut. CO₂ gas is released into the chamber and the animal quickly dies after inhaling the gas. This method is approved as a euthanizing agent by the American Veterinary Medical Association (AVMA 2001). CO₂ gas is a byproduct of animal respiration, is common in the atmosphere, and is required by plants for photosynthesis. It is nonflammable, nonexplosive, and poses minimal hazard to personnel. Importantly, it does not accumulate in tissue residues in animals destined for human consumption. CO₂ is used to carbonate beverages for human consumption and is also the gas released by dry ice. The AVMA lists the use of compressed CO₂ gas in cylinders as acceptable for the following animals: amphibians, birds, cats, dogs, fish, furbearers, rabbits, certain reptiles, swine, and zoo animals. The use of CO₂ by WS for euthanasia purposes is exceedingly minor and inconsequential to the amounts used for other purposes by society.

Ketamine hydrochloride is a dissociative anesthetic that is used to capture wildlife, primarily mammals, birds, and reptiles. It is used to eliminate pain, calm fear, and allay anxiety. Ketamine is possibly the most versatile drug for chemical capture, and it has a wide safety margin (Fowler and Miller 1999). When used alone, this drug may produce muscle tension, resulting in shaking, staring, increased body heat, and, on occasion, seizures. Usually, ketamine is combined with other drugs such as xylazine. The combination of such drugs is used to control an animal, maximize the reduction of stress and pain, and increase human and animal safety.

Xylazine (Rompun) is a sedative (analgesic) that calms nervousness, irritability, and excitement, usually by depressing the central nervous system. Xylazine is commonly used with ketamine to produce a relaxed anesthesia. It can also be used alone to facilitate physical restraint. Because xylazine is not an anesthetic, sedated animals are usually responsive to stimuli. Therefore, personnel should be even more attentive to minimizing sight, sound, and touch. When using ketamine/xylazine combinations, xylazine will usually overcome the tension produced by ketamine, resulting in a relaxed, anesthetized animal (Fowler and Miller 1999). This reduces heat production from muscle tension, but can lead to lower body temperatures when working in cold conditions.

Yohimbine is a reversal agent for xylazine, and is typically administered to the animal approximately 45 minutes after the ketamine/xylazine dose.

Sodium Pentobarbital and its derivatives are barbiturates that rapidly depress the central nervous system to the point of respiratory arrest. Some states may have additional requirements for personnel training and particular sodium pentobarbital products available for use in wildlife. Nationally, certified WS personnel are authorized to use sodium pentobarbital and dilutions for euthanasia in accordance with DEA regulations.

Potassium Chloride used in conjunction with prior general anesthesia is used as a euthanasia agent for animals, and is considered acceptable and humane by the AVMA (AVMA 2001). Animals that have been euthanized with this chemical experience cardiac arrest followed by death, and are not toxic to predators or scavengers.

Alpha-chloralose is a central nervous system depressant used as an immobilizing agent to capture and remove nuisance waterfowl and other birds. It is labor intensive and in some cases, may not be cost effective (Wright 1973, Feare et al. 1981), but is typically used in recreational and residential areas, such as swimming pools, shoreline residential areas, golf courses, or resorts. Alpha-chloralose is typically delivered as a well-contained bait in small quantities with minimal hazards to pets and humans; single bread or corn baits are fed directly to the target birds. WS personnel are present at the site of application during baiting to retrieve the immobilized birds. Unconsumed baits are removed from the site following each treatment. Alpha-chloralose was eliminated from more detailed analysis in USDA (1997) based on critical element screening, therefore, environmental fate properties of this compound were not rigorously assessed. However, the solubility and mobility are believed to be moderate and environmental persistence is believed to be low. Bio-accumulation in plants and animal tissue is believed to be low. Alpha-chloralose is used in other countries as an avian and mammalian toxicant. The compound is slowly metabolized, with recovery occurring a few hours after administration (Schafer 1991). The dose used for immobilization is designed to be about two to 30 times lower than the LD₅₀. Mammalian data indicate higher LD₅₀ values than birds. Toxicity to aquatic organisms is unknown (Woronecki et al. 1990) but the compound is not generally soluble in water and therefore should remain unavailable to aquatic organisms. Factors supporting the determination of this low potential included the lack of exposure to pets, nontarget species and the public, and the low toxicity of the active ingredient. Other supporting rationale for this determination included relatively low total annual use and a limited number of potential exposure pathways. The agent is currently approved for use by WS as an Investigative New Animal Drug by the FDA rather than a pesticide.

Repellents are usually naturally occurring substances or chemicals formulated to be distasteful or to elicit pain or discomfort for target animals when they are smelled, tasted, or contacted. Repellents are not available for many species which may present damage problems, such as some predators or furbearing species. Repellents are variably effective and depend to a great extent on resource to be protected, time and length of application, and sensitivity of the species causing damage. Acceptable levels of damage control are usually not realized unless repellents are used in conjunction with other techniques, as part of an integrated damage management program.

Methyl anthranilate (artificial grape flavoring used in foods and soft drinks for human consumption) could be used or recommended by WS as a bird repellent. Methyl anthranilate (MA) (artificial grape flavoring food additive) has been shown to be an effective repellent for many bird species, including waterfowl (Dolbeer et al. 1993). Methyl anthranilate (MA) is also under investigation as a potential bird taste repellent. MA may become available for use as a livestock feed additive (Mason et.al. 1984; 1989). It is registered for applications to turf or to surface water areas used by unwanted birds. The material has been shown to be nontoxic to bees ($LD_{50} > 25$ micrograms/bee⁴), nontoxic to rats in an inhalation study ($LC_{50} > 2.8 \text{ mg/L}^i$), and of relatively low toxicity to fish and other invertebrates. Methyl anthranilate is naturally occurring in concord grapes and in the blossoms of several species of flowers and is used as a food additive and perfume ingredient (Dolbeer et al. 1992; RJ Advantage, Inc. 1997). It has been listed as "Generally Recognized as Safe" (GRAS) by the U.S. Food and Drug Administration (Dolbeer et al. 1992).

³An LD₅₀ is the dosage in milligrams of material per kilogram of body weight, or, in this case in micrograms per individual bee, required to cause death in 50% of a test population of a species.

Water surface and turf applications of MA are generally considered expensive. For example, the least intensive application rate required by label directions is 20 lbs. of product (8 lbs. active ingredient) per acre of surface water at a cost of about \$64/lb. with retreating required every 3-4 weeks (RJ Advantage, Inc. 1997). An example of the level of expense involved is a golf course in Rio Rancho, NM where it was estimated that treating four watercourse areas would cost in excess of \$25,000 per treatment for material alone. Cost of treating turf areas would be similar on a per acre basis. Also, MA completely degrades in about 3 days when applied to water (RJ Advantage, Inc. 1997) which indicates the repellent effect is short-lived.

Another potentially more cost effective method of MA application is by use of a fog-producing machine (Vogt 1997). The fog drifts over the area to be treated and is irritating to the birds while being non-irritating to any humans that might be exposed. Fogging applications must generally be repeated 3-5 times after the initial treatment before the birds abandon a treatment site (Dr. P. Vogt, RJ Advantage, Inc., pers. comm. 1997). Applied at a rate of about .25 lb./ acre of water surface, the cost is considerably less than when using the turf or water treatment methods.

MA is also being investigated as a livestock feed additive to reduce or prevent feed consumption by birds. Such chemicals undergo rigorous testing and research to prove safety, effectiveness, and low environmental risks before they would be registered by U.S. Environmental Protection Agency (EPA) or the Food and Drug Administration (FDA).

Other Repellents. Research continues on other avian feeding repellents. A 50% anthraquinone product (FlightControl), shows promise for waterfowl (Dolbeer et al. 1998). Like MA, anthraquinone has low toxicity to birds and mammals. Activated charcoal has also been evaluated for use in deterring waterfowl damage, but it requires frequent re-application to effectively reduce waterfowl damage (Mason and Clark 1995). Further, laboratory and field trials are needed to refine minimum repellent levels and to enhance retention of treated vegetation (Sinnott 1998).

Appendix C. Federally Listed Threatened and Endangered Species in Florida

Animals

Alligator, American (Alligator mississippiensis)

Bankclimber, purple (mussel) (Elliptoideus sloatianus)

Bat, gray (Myotis grisescens)

Butterfly, Schaus swallowtail (Heraclides aristodemus ponceanus)

Caracara, Audubon's crested (FL pop.) (Polyborus plancus audubonii)

Crane, whooping U.S.A. (CO, ID, FL, NM, UT, and the western half of

Wyoming) (Grus americana)

Crocodile, American (Crocodylus acutus)

Darter, Okaloosa (Etheostoma okaloosae)

Deer, key (Odocoileus virginianus clavium)

Eagle, bald (lower 48 States) (Haliaeetus leucocephalus)

Jay, Florida scrub (Aphelocoma coerulescens)

Kite, Everglade snail (FL pop.) (Rostrhamus sociabilis plumbeus)

Manatee, West Indian (Trichechus manatus)

Moccasinshell, Gulf (Medionidus penicillatus)

Moccasinshell, Ochlockonee (Medionidus simpsonianus)

Mouse, Anastasia Island beach (Peromyscus polionotus phasma)

Mouse, Choctawhatchee beach (Peromyscus polionotus allophrys)

Mouse, Key Largo cotton (Peromyscus gossypinus allapaticola)

Mouse, Perdido Key beach (Peromyscus polionotus trissyllepsis)

Mouse, southeastern beach (Peromyscus polionotus niveiventris)

Mouse, St. Andrew beach (Peromyscus polionotus peninsularis)

Panther, Florida (Puma (=Felis) concolor coryi)

Pigtoe, oval (Pleurobema pyriforme)

Plover, piping (except Great Lakes watershed) (Charadrius melodus)

Pocketbook, shinyrayed (Lampsilis subangulata)

Rabbit, Lower Keys marsh (Sylvilagus palustris hefneri)

Rice rat (lower FL Keys) (Oryzomys palustris natator)

Salamander, flatwoods (Ambystoma cingulatum)

Sea turtle, green (Chelonia mydas)

Sea turtle, hawksbill (Eretmochelys imbricata)

Sea turtle, Kemp's ridley (Lepidochelys kempii)

Sea turtle, leatherback (Dermochelys coriacea)

Sea turtle, loggerhead (Caretta caretta)

Seal, Caribbean monk (Monachus tropicalis)

Shrimp, Squirrel Chimney Cave (Palaemonetes cummingi)

Skink, bluetail mole (Eumeces egregius lividus)

Skink, sand (Neoseps reynoldsi)

Slabshell, Chipola (Elliptio chipolaensis)

Snail, Stock Island tree (Orthalicus reses (not incl. nesodryas))

Snake, Atlantic salt marsh (Nerodia clarkii taeniata)

Snake, eastern indigo (Drymarchon corais couperi)

Sparrow, Cape Sable seaside (Ammodramus maritimus mirabilis)

Sparrow, Florida grasshopper (Ammodramus savannarum floridanus)

Stork, wood (AL, FL, GA, SC) (Mycteria americana)

Sturgeon, gulf (Acipenser oxyrinchus desotoi)

Sturgeon, shortnose (Acipenser brevirostrum)

Tern, roseate (Western Hemisphere except NE U.S.) (Sterna dougallii dougallii)

Three-ridge, fat (mussel) (Amblema neislerii)

Vole, Florida salt marsh (Microtus pennsylvanicus dukecampbelli)

Whale, finback (Balaenoptera physalus)

Whale, humpback (Megaptera novaeangliae)

Whale, right (Balaena glacialis (incl. australis))

Wolf, red (except where XN) (Canis rufus)

Woodpecker, red-cockaded (Picoides borealis)

Wood rat, Key Largo (Neotoma floridana smalli)

Plants

Lead-plant, Crenulate (Amorpha crenulata)

Pawpaw, four-petal (Asimina tetramera)

Bonamia, Florida (Bonamia grandiflora)

Bellflower, Brooksville (Campanula robinsiae)

Prickly-apple, fragrant (Cereus eriophorus var. fragrans)

Spurge, deltoid (Chamaesyce deltoidea ssp. deltoidea)

Spurge, Garber's (Chamaesyce garberi)

Fringe-tree, pygmy (Chionanthus pygmaeus)

Aster, Florida golden (Chrysopsis floridana)

Cladonia, Florida perforate (Cladonia perforata)

Pigeon wings (Clitoria fragrans)

Rosemary, short-leaved (Conradina brevifolia)

Rosemary, Etonia (Conradina etonia)

Rosemary, Apalachicola (Conradina glabra)

Harebells, Avon Park (Crotalaria avonensis)

Gourd, Okeechobee (Cucurbita okeechobeensis ssp. okeechobeensis)

Pawpaw, beautiful (Deeringothamnus pulchellus)

Pawpaw, Rugel's (Deeringothamnus rugelii)

Mint, Garrett's (Dicerandra christmanii)

Mint, longspurred (Dicerandra cornutissima)

Mint, scrub (Dicerandra frutescens)

Mint, Lakela's (Dicerandra immaculata)

Buckwheat, scrub (Eriogonum longifolium var. gnaphalifolium)

Snakeroot (Eryngium cuneifolium)

Spurge, telephus (Euphorbia telephioides)

Milkpea, Small's (Galactia smallii)

Seagrass, Johnson's (Halophila johnsonii)

Beauty, Harper's (Harperocallis flava)

Hypericum, highlands scrub (Hypericum cumulicola)

Jacquemontia, beach (Jacquemontia reclinata)

Water-willow, Cooley's (Justicia cooleyi)

Blazingstar, scrub (Liatris ohlingerae)

Lupine, scrub (Lupinus aridorum)

Birds-in-a-nest, white (Macbridea alba)

Beargrass, Britton's (Nolina brittoniana)

Whitlow-wort, papery (Paronychia chartacea)

Cactus, Key tree (Pilosocereus robinii)

Butterwort, Godfrey's (Pinguicula ionantha)

Polygala, Lewton's (Polygala lewtonii)

Polygala, tiny (Polygala smallii)

Wireweed (Polygonella basiramia)

Sandlace (Polygonella myriophylla)

Plum, scrub (Prunus geniculata)

Rhododendron, Chapman (Rhododendron chapmanii)

Gooseberry, Miccosukee (Ribes echinellum)

Chaffseed, American (Schwalbea americana)
Skullcap, Florida (Scutellaria floridana)
Campion, fringed (Silene polypetala)
Pinkroot, gentian (Spigelia gentianoides)
Meadowrue, Cooley's (Thalictrum cooleyi)
Torreya, Florida (Torreya taxifolia)
Warea, wide-leaf (Warea amplexifolia)
Mustard, Carter's (Warea carteri)
Ziziphus, Florida (Ziziphus celata)

Appendix D. Correspondence from USFWS Regarding Federal T&E Species



United States Department of the Interior

FISH AND WILDLIFE SERVICE, South Florida Feological Services Office 1339 20th Street Vero Beach, Florida 32960



May 12, 2005

Brian Schoch U.S. Department of Agriculture APHIS, Wildlife Services 2740 Southwest Martin Downs Boulevard Palm City, Florida 34990

> Service Log No.: 4-1-05-PL-10506 Date Received: James 6, 2005

Project: Integrated Wildlife Damage Management

Plan for Palm Beach County Parks and

Recreation Lands Department

County: Palm Beach

Dear Mr. Schoch:

The Fish and Wildfite Service (Service) has reviewed your letter dated December 28, 2004, and other information submitted by the Animal and Plant Health Inspection Service Wildlife Services (APHIS WS) for the project referenced above. This letter is submitted in accordance with section 7 of the Findangered Species Act of 1973, as amended (ESA) (87 Stat. 884: 16 U.S.C. 1531 *et seq.*).

PROJECT DESCRIPTION

The Palm Beach County Parks and Recreation Department (PBCPRD) has asked the APHIS WS to assist in reducing wildlife damage and conflicts on their properties. In response, the APHIS WS proposes to implement an Integrated Wildlife Management Strategy (Strategy). The Strategy consists of offering technical assistance and direct management through lethal and conslicted methods. Management methods would include physical exclusion, habitat modification, harassment, shooting, trapping, egg destruction, and chemical aversion techniques. Target species would include opossums, raccoons, coyotes, gray foxes, feral mammals and birds, and rodents. The purpose of the Strategy is to reduce wildlife damage to property and natural resources, and promote public health and safety. The project area is located on lands owned and administered by the PBCPRD in Palm Beach County, Florida.

THREATENED AND ENDANGERED SPECIES

The APHIS WS has determined the project "may affect, but is not likely to adversely affect" any tederally listed threatened or endangered species. The Service has reviewed the Environmental Assessment for the proposed Strategy that details the methods that would be implemented to



Brian Schoeh Page 2

reduce wildlife damage. We note that the APHIS WS has developed procedures that minimize the potential for adverse affects to threatened and endangered species, as well as other non-target wildlife species. Accordingly, the Service concurs with APHIS WS's determination.

This letter fulfills the requirements of section 7 of the ESA and no further action is required. If modifications are made to the project, if additional information involving potential effects to listed species becomes available, or if a new species is listed, reinitiation of consultation may be necessary.

Thank you for allowing us to provide these comments and for your cooperation and effort in protecting federally listed species. If you have any questions regarding this project, please contact John Wrublik at 772-562-3909, extension 282.

Sincerely yours.

Allan Julker

James J. Slack Field Supervisor

South Florida Ecological Services Office

ce

DEP, West Palm Beach, Florida EPA, West Palm Beach, Florida

TWC, Vero Beach, Florida

Appendix E. State Listed Threatened and Endangered Species in Florida

<u>Fish</u>

Shortnose sturgeon (Acipenser brevirostrum)

Blackmouth shiner (Notropis melanostomus)

Key silverside (Menidia conchorum)

Crystal darter (Crystallaria asprella)

Okaloosa darter (Etheostoma olalossae)

Reptiles

American crocodile (Crocodylus acutus)

Key ringneck snake (Diadophis punctatus acricus)

Eastern indigo snake (Drymarchon corais couperi)

Atlantic salt marsh water snake (Nerodia clarkii taeniata)

Short-tailed snake (Stilosoma extenuatum)

Florida brown snake (Storeria dekayi victa)

Rim rock crowned snake (Tantilla oolitica)

Florida ribbon snake (Thamnophis sauritus sackeni)

Bluetail mole skink (Eumeces egregious lividus)

Sand skink (Neoseps reynoldsi)

Striped mud turtle (Kinosternon baurii)

Loggerhead sea turtle (Caretta caretta)

Green sea turtle (Chelonia mydas)

Hawksbill sea turtle (Eretmochelys imbricata)

Kemp's ridley sea turtle (Lepidochelys kempii)

Birds

Piping plover (Charadrius melodus)

Snowy plover (Charadrius alexandrinus)

Least tern (Sterna antillarum)

Roseate tern (Sterna dougalli)

Florida sandhill crane (Grus canadensis pratensis)

Wood stork (Mycteria americana)

Crested caracara (Caracara cheriway)

Peregrine falcon (Falco peregrinus)

Southeastern American kestrel (Falco sparverius paulus)

Bald eagle (Haliaeetus leucocephalus)

Everglades snail kite (Rostrhamus sociabilis plumbeus)

Florida scrub jay (Aphelocoma coerulescens)

Cape Sable seaside sparrow (Ammodramus maritimus mirabilis)

Florida grasshopper sparrow (Ammodramus savannarum floridanus)

White-crowned pigeon (Columba leucocephala)

Kirtland's warbler (Dendroica kirtlandii)

Bachman's warbler (Vermivora bachmanii)

Ivory-billed woodpecker (Campephilus principalis)

Mammals

Florida panther (Puma concolor coryi)

Florida black bear (Ursus americanus floridanus)

Everglades mink (Mustela vison evergladensis)

Key deer (Odocoileus virginianus clavium)

Lower Keys marsh rabbit (Sylvilagus palustris hefneri)

Big Cypress fox squirrel (Sciurus niger avicennia)

Silver rice rat (Oryzomys argentatus)

Key Largo wood rat (Neotoma floridana smalli)

Key Largo cotton mouse (Peromyscus gossypinus allapaticola)

Choctawhatchee beach mouse (Peromyscus polionotus allophrys)

Southeastern beach mouse (Peromyscus polionotus niveiventris)

Anastasia Island beach mouse (Peromyscus polionotus phasma)

St. Andrews beach mouse (Peromyscus polionotus peninsularis)

Perdido Key beach mouse (Peromyscus polionotus trissyllepsis)

Florida mastiff bat (Eumops glaucinus floridanus)

Gray bat (Myotis grisescens)

Indiana bat (Myotis sodalis)

Florida salt marsh vole (Microtus pennsylvanicus dukecampbelli)

Sei whale (Balaenoptera borealis)

Fin whale (Balaenoptera physalus)

Right whale (Eubalaena glacialis)

Humpback whale (Megaptera novaeangliae)

Sperm whale (Physeter macrocephalus)

Florida manatee (Trichchus manatus latirostris)

Corals

Pillar coral (Dendrogyra cylindrus)

Insects

Miami blue butterfly (Cyclargus thomasi bethunebakeri)

Schaus' swallowtail butterfly (Heraclides aristodemus ponceanus)

Mollusks

Stock Island tree snail (Orthalicus reses)

Appendix F. Correspondence from FFWCC Regarding State-Listed T&E Species

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION



RODNEY BARRETEO Munuu

KATHY BARCO single-marketic

SANDRA T. KAUPE Palm Beach

> RECHARD A CORBETT Tamper

HUFFMAN Enterprise

DAVID K MERHAN St. Petersburg

BHIAN S. YABLONSK: Tallahasser

KENNETH D. HADDAL, Encourse, Director VICEORG HEIGER Associal Executive Physica

OFFICE OF THE EXECUTIVE DIRECTOR (350:487-379-TEO (350:488-9582

January 31, 2005

Mr. Brian Schoch USDA APHIS Wildlife Services 2740 SW Martin Downs Bivd. Palm City, FL 34990

Dear Mr. Schoch:

I have reviewed the Environmental Assessment prepared by USDA APHIS Wildlife Services for Paim Beach County Parks and Recreation Department. I concur with the U.S. Fish and Wildlife Services that Alternative 2: Integrated Wildlife Damage Management Program (4.1.2.2) will not adversely impact any state or federally endangered or threatened wildlife species.

The control actions to be employed by the above option appear to be very target specific. Further, the use of chemicals will be restricted to the immobilization and euthanizing of target animals.

The other 3 alternatives employ either no action by Wildlife Services or are limited to nonlethal methods. These alternatives will also not harm or impact any threatened or engangered wildlife.

Thank you for considering us in this matter. If you would like to discuss this further please do not hesitate to contact me at (561) 625-5122.

Sincerely

Ricerdo Zambrano

Régional Nongame Biologist

Appendix G. Palm Beach County Park Operations Division – Park Information for Animal Management Plan

Palm Beach County Parks and Recreation Department

Park Operations Division

Parks for USDA Animal Management Plan



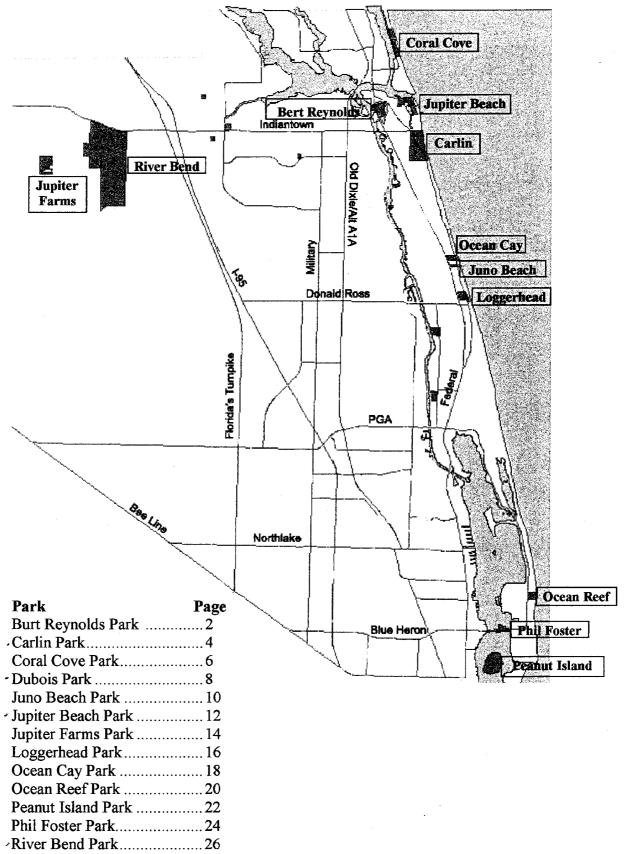
Palm Beach County Park Operations Division Park Information for Animal Management Plan

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Palm Beach County North District Parks



Burt Reynolds Park

ENTRANCE: 800 & 801 N. U.S. Hwy. 1, Jupiter, FL 33477

CLASS: District/Special Facility

ACREAGE: 35.55 Acres

Hours: Sunrise-Sunset (Boat Ramps 24 Hours)

FACILITIES: Intracoastal Waterway frontage (2,000 feet)

Fishing (salt water)

Boat launching ramps: 6

Boat/trailer parking spaces: 158 Boat slips (day use only): 6 Family picnic shelters: 6 Picnic areas with grills Restroom facilities

Parking spaces (5 accessible spaces): 52

LOCATION OF: Florida History Museum

Jupiter/Tequesta Chamber of Commerce

HABITAT: Mangrove swamp

VEGETATION: Red, Black & White Mangroves

ANIMALS: Squirrels, Raccoons

TRAP HISTORY: none





BURT REYNOLDS PARK

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Source: Palm Seach County GIS Coordination Palm Beach County Parks and Recreated Image Date: 2002 Map Date: April 27, 2003 Created By: B. Hamilton File: Bert Reynolds AgrisLpd



Carlin Park

ENTRANCE: 400 S.R. A1A, Jupiter, FL 33477

CLASS: Beach

ACREAGE: 120.31 Acres

Hours: Sunrise-Sunset, Lighted facilities open until 11 pm

FACILITIES: Guarded beach frontage (3,000 feet)

Salt water fishing Baseball field Multipurpose field Tennis courts: 6

Special event/performing arts area (amphitheater)

Children's play areas: 3

Exercise course: 20 stations/1.4 miles

Lazy Logger Restaurant

Bocce court

Reserved group picnic pavilions: 3

Volleyball area

Family picnic shelters: 27 Picnic areas with grills Restroom facilities Outdoor showers

Parking spaces (5 accessible spaces): 435

LOCATION OF: Town of Jupiter Civic Center

HABITAT: Coastal dune and strand

Florida scrub Mangrove swamp

Lake/Pond

VEGETATION: Sea grape, Sea oats, Beach Jacquemontia, Half flower, Coin vine

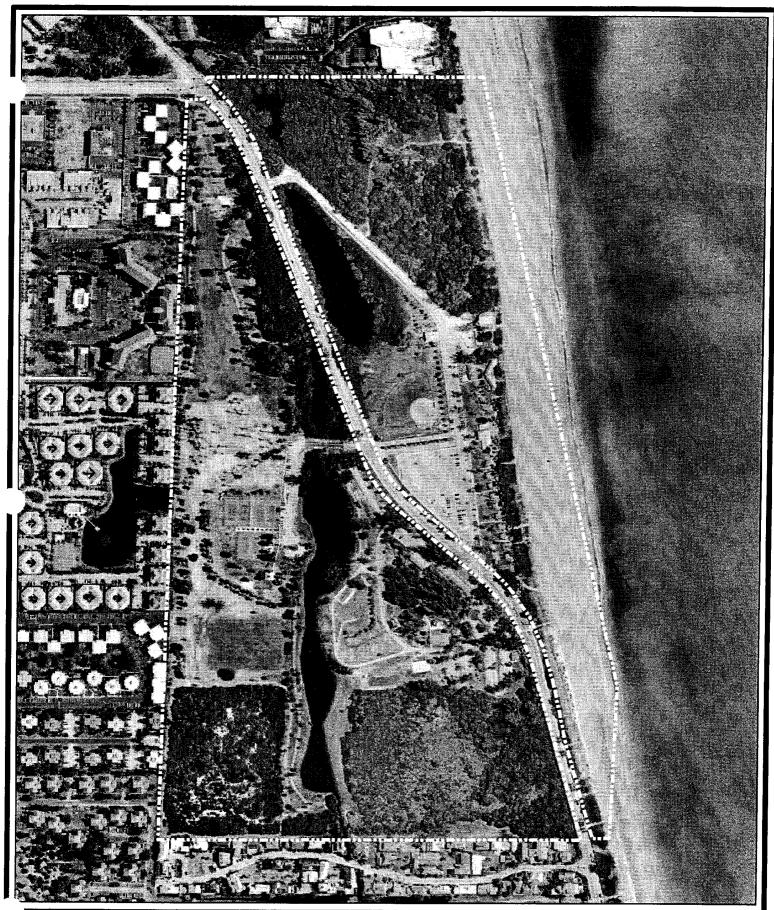
Sand pine, Love vine, Chapman oak, Saw palmetto, So. Fla. Slash pine

Red, Black & White Mangroves

Shoreline vegetation, Brazilian pepper, Cabbage palm

ANIMALS: Muscovy Ducks, Squirrels, Scrub Jay, Gopher Tortoise, Skunk

TRAP HISTORY: 7/17/01 1 Cat





CARLIN PARK

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urce; Im Beach County GIS Coordination Im Beach County Parks and Recreation age Date; 2002 Map Date: July 24, 2003 Created By: B. Hamilton File: Carlin Asrial.pdf



Coral Cove Park

ENTRANCE: 19450 S.R. 707, Tequesta, FL 33469

CLASS: Beach

ACREAGE: 31.42 Acres

Hours: Sunrise-Sunset

FACILITIES: Guarded beach frontage (600 feet)

Intracoastal Waterway frontage (600 feet)

Fishing and surfing not permitted in guarded swimming areas

Children's play area Picnic areas with grills Restroom facilities Outdoor showers Parking spaces: 115

LOCATION OF:

HABITAT: Coastal dune and strand

Mangrove swamp

VEGETATION: Sea grape, Sea oats, Coin vine, Saw palmetto, Railroad vine

Red, Black & White Mangroves

ANIMALS: Raccoons, Squirrels

TRAP HISTORY: none





CORAL COVE PARK

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ource: alm Beach County GIS Coordination alm Beach County Parks and Recreation hape Date: 2002 Map Date: July 24, 2003 Created By: B. Hamilton File: Coral Cove Aerial.pdf



Dubois Park

ENTRANCE: 19075 Dubois Rd., Jupiter, FL 33477

CLASS: Beach

ACREAGE: 18.69 Acres

Hours: Sunrise-Sunset

Guarded Beach: Winter-Weekends & Holidays, Summer-7 Days a Week

FACILITIES: Beach frontage (1,200 feet);

Guarded beach; frontage (100 feet);

Fishing (salt water) & surfing not permitted in swimming areas

Jetty

Reserved group picnic pavilion

Volleyball area

Picnic areas with grills Restroom facilities Outdoor showers Parking spaces: 144

LOCATION OF: Dubois Pioneer Home

Indian Mound historical/archaeological site

HABITAT: Mangrove swamp

VEGETATION: Red, Black & White Mangroves, Australian pine

ANIMALS: Raccoons, Feral Cats

TRAP HISTORY: 7/12/01 4 Raccoons

7/13/01 5 Raccoons 7/17/01 4 Raccoons





DUBOIS PARK

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Source: Palm Beach County GIS Coordination Palm Beach County Parks and Recreati mane Date: 2002 Map Date: August 5, 2003 Created By: B. Hamillon File: Ouldois Aerial.pdf



Juno Beach Park

ENTRANCE: 14775 S. R. A1A, Juno Beach, FL 33408

CLASS: Beach

ACREAGE: 5.24 Acres

Hours: Sunrise-Sunset

FACILITIES: Saltwater fishing pier (990 feet)

with bait shop and snack bar.
Guarded beach frontage (300 feet)
(Daily designated surf area available)

Family picnic shelters: 12

Restroom facilities Outdoor showers Parking spaces: 318

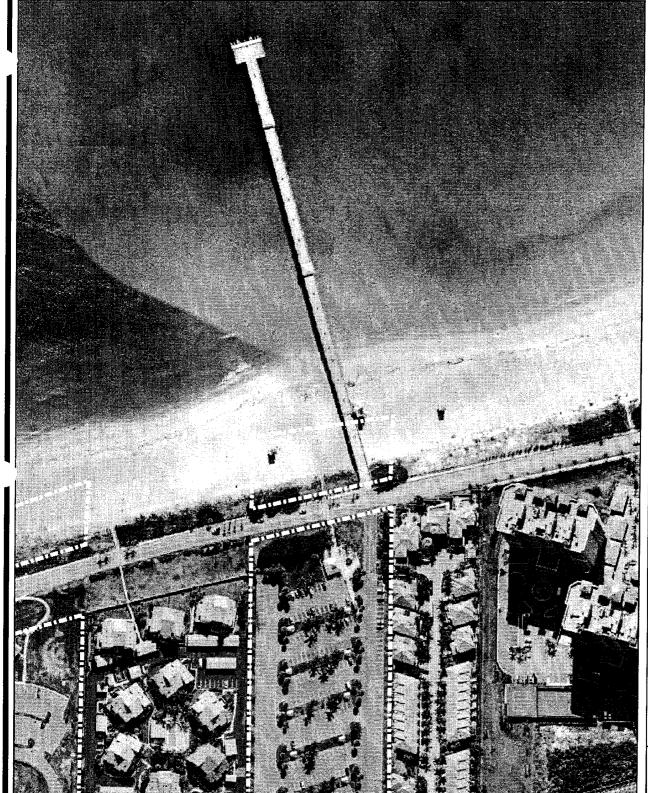
LOCATION OF:

HABITAT: Coastal dune and strand

VEGETATION: Sea grape, Sea oats, Railroad vine, Morning glory, Dune sunflower

ANIMALS:

TRAP HISTORY: none





JUNO BEACH PARK

PALM BEACH COUNTY
PARKS AND RECREATION DEPARTMENT

Jupiter Beach Park

ENTRANCE: 1375 Jupiter Beach Rd., Jupiter, Fl 33477

CLASS: Beach

ACREAGE: 46.49 Acres

Hours: Sunrise-Sunset (Inlet Fishing 24 Hours)

FACILITIES: Guarded beach frontage (1,700 feet)

Fishing (salt water)

Jetty

Children's play areas: 2

Reserved group picnic pavilion

Picnic areas with grills Restroom facilities Outdoor showers Parking spaces: 163

LOCATION OF:

HABITAT: Coastal dune and strand

Mangrove swamp

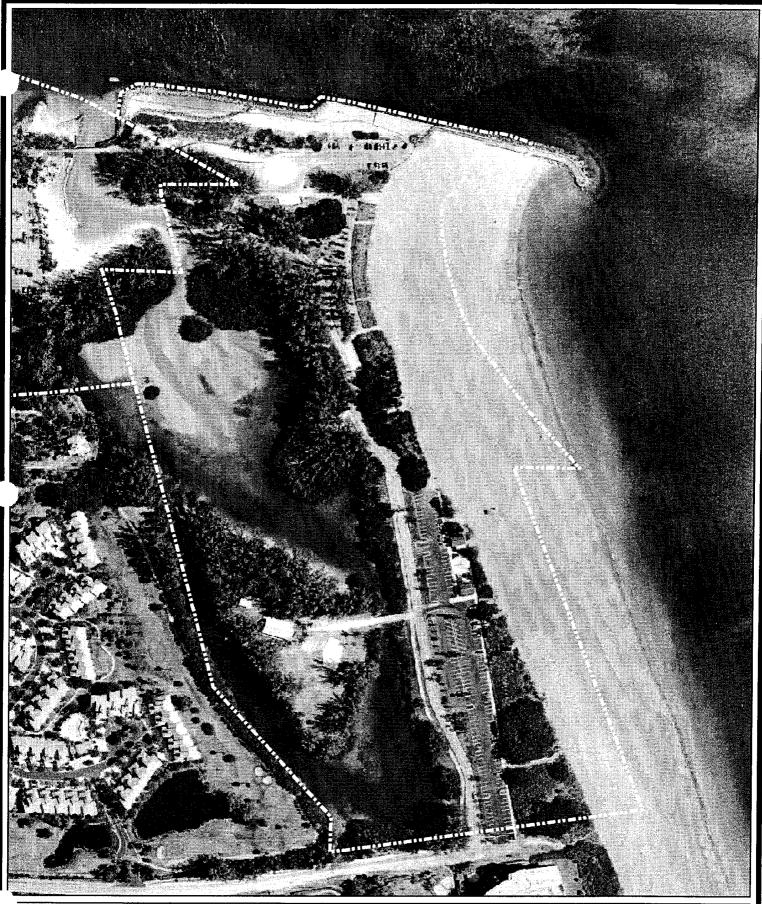
VEGETATION: Sea grape, Sea oats, Railroad vine, Morning glory, Australian pine

Australian pine, Red, Black & White Mangroves

ANIMALS: Feral Cats, Raccoons, Squirrels

TRAP HISTORY: 9/14/01 4 Kittens

6/5/03 1 Cat





JUPITER BEACH PARK

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Jupiter Farms Park

ENTRANCE: 1375 Jupiter Beach Rd., Jupiter, Fl 33477

CLASS: District

ACREAGE: 51.5 Acres

Hours: Sunrise-Sunset, Lighted facilities open until 11pm

FACILITIES: Multipurpose open field

Baseball fields: 2 Children's play area Parking spaces: 104

LOCATION OF:

HABITAT: Marsh

Cypress Swamp Lake/Pond

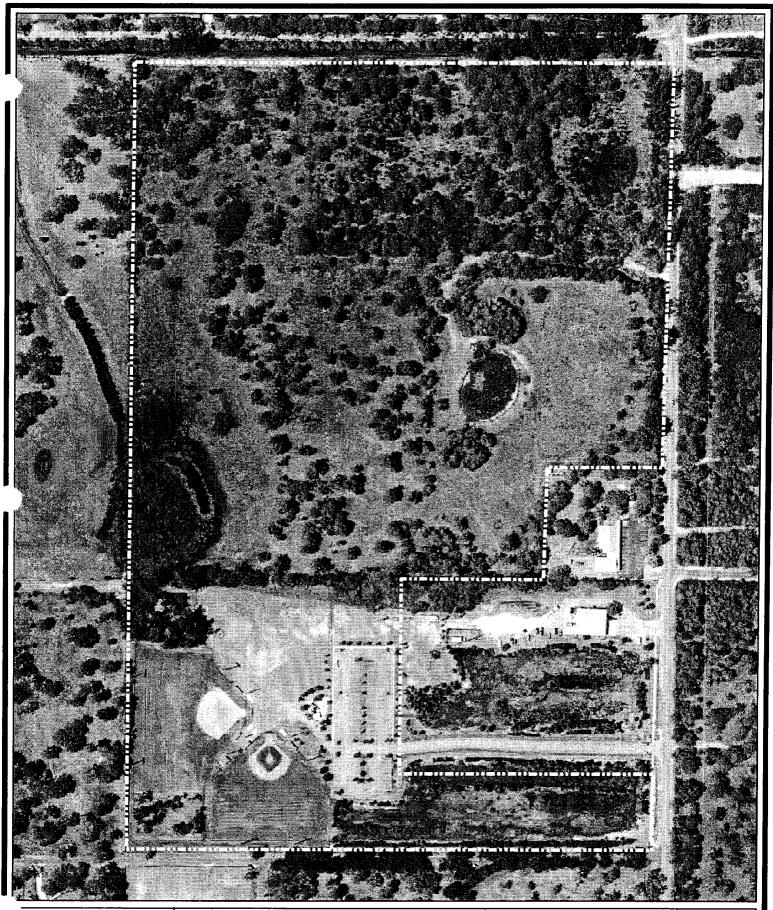
VEGETATION: Spike rush, Spatter dock, Wax myrtle, Coco plum, Myrsine, Grasses

Bald/Pond cypress, Cabbage palm, Myrsine, Wax myrtle

Spatter dock, Arrowhead, Spike rush

ANIMALS:

TRAP HISTORY: none





JUPITER FARMS PARK

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Map Date: July 24, 2003 Created By: B. Hamilton File: Jupiler Farms AerisLpd



Loggerhead Park

ENTRANCE: 14200 U.S. Hwy. 1, Juno Beach, FL 33408

CLASS: Beach

ACREAGE: 17.265 Acres

Hours: Sunrise-Sunset, Lighted facilities open until 11 pm

FACILITIES: Guarded beach frontage (900 feet)

Fishing (salt water) Tennis courts: 4 Tennis pavilion Children's play area

Nature trail Activity building

Family picnic shelters: 7

Reserved group picnic pavilion

Observation tower Volleyball area Horseshoe area

Picnic areas with grills Restroom facilities Outdoor showers Parking spaces: 218

LOCATION OF: North District Beach Patrol Headquarters

Marinelife Center

Celestial Railroad Historical Site

HABITAT: Coastal dune & strand

Florida scrub

VEGETATION: Sea grape, Sea oats, Railroad vine, Coin vine, Dune panic grass

Beach Jacquemontia, Love vine, Chapman oak, Saw palmetto

ANIMALS: Rats

TRAP HISTORY: none





Loggerhead Park



Ocean Cay Park

ENTRANCE: 2188 Marcinski Rd, Jupiter Fl 33477

CLASS: Beach

ACREAGE: 13.44 Acres

Hours: Sunrise-Sunset

FACILITIES: Guarded beach frontage (700 feet)

Fishing (salt water)
Children's play area
Sand volleyball courts: 4
Family picnic shelters: 7

Reserved group picnic pavilions: 2

Restroom facilities Outdoor shower Sitting plaza Bus shelter

Dune crossover boardwalk

Parking spaces: 220

LOCATION OF:

HABITAT: Coastal dune & strand

VEGETATION: Sea grape, Sea oats, Railroad vine, Dune sunflower

ANIMALS:

TRAP HISTORY: none







Ocean Cay Park

Ocean Reef Park

ENTRANCE: 3860 N. Ocean Blvd., Riviera Beach, FL 33404

CLASS: Beach

ACREAGE: 12.62 Acres

Hours: Sunrise-Sunset

FACILITIES: Guarded beach frontage (700 feet)

Fishing (saltwater)
Children's play area
Dune ecosystem/overlook
Picnic areas with grills
Restroom facilities

Outdoor showers Parking spaces: 242

LOCATION OF:

HABITAT: Coastal dune & strand

Tropical hammock

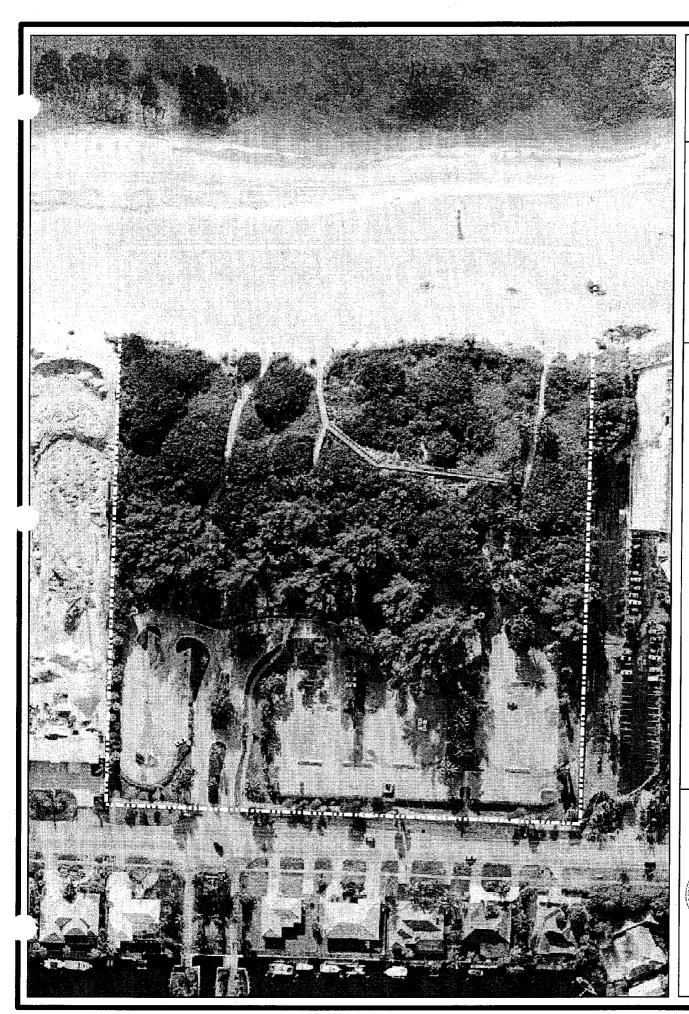
VEGETATION: Sea grape, Sea oats, Railroad vine, Coin vine, Half flower

Strangler fig, Gumbo limbo, Cabbage palm, Fire bush, Wild coffee

ANIMALS: Feral Cats, Squirrels

TRAP HISTORY: 6/5/03 3 Kittens

North District Parks 20





OCEAN REEF PARK

PALM BEACH COUNTY
PARKS AND RECREATION DEPARTMENT

21

Peanut Island Park

ENTRANCE: Access by boat only. Ferry service available from Riviera Beach Marina.

CLASS: Special Facility

ACREAGE: 86.27 Acres

Hours: Sunrise-Sunset (Not including camping areas)

FACILITIES: Intracoastal Waterway Frontage

Saltwater fishing Water skiing Fishing pier Boat dock Boat slips: 18

Tent camp sites: 20

Group picnic pavilions: 2 (first come, first serve) Group picnic pavilion (registered camper use only)

Picnic area with grills Group fire ring

Paver block walking path

Restroom facilities

LOCATION OF: Palm Beach Maritime Museum and Kennedy Bunker

HABITAT: Mangrove swamp

Estuarine

VEGETATION: Red, Black & White Mangroves

Johnsons sea grass

ANIMALS: Raccoons

TRAP HISTORY: 8/9/01 3 Raccoons

8/10/01 2 Raccoons 8/13/01 2 Raccoons 8/15/01 2 Raccoons 8/17/01 1 Raccoon 8/24/01 3 Raccoons 2/11/02 2 Raccoons





Peanut Island Park

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Source: Palm Beach County GIS Coordination Palm Beach County Parks and Recreation Image Date; 1999 Mep Date: August 14, 2002 Created By: B. Hamilton File: Peanut Island Aerial.pdf



SCALE: 1" = 325"

Phil Foster Park

ENTRANCE: 900 E. Blue Heron Blvd., Riviera Beach, FL 33404

CLASS: Beach

ACREAGE: 14.65 Acres

Hours: Sunrise-Sunset (Boat ramps 24 hours)

FACILITIES: Intracoastal Waterway frontage (1,000 feet)

Guarded swimming area Fishing (salt water)

Water skiing

Boat launching ramps: 4

Boat/trailer parking spaces: 81 Boat slips (day use only): 4

Children's play area Picnic areas with grills Restroom facilities Outdoor showers Parking spaces: 280

LOCATION OF:

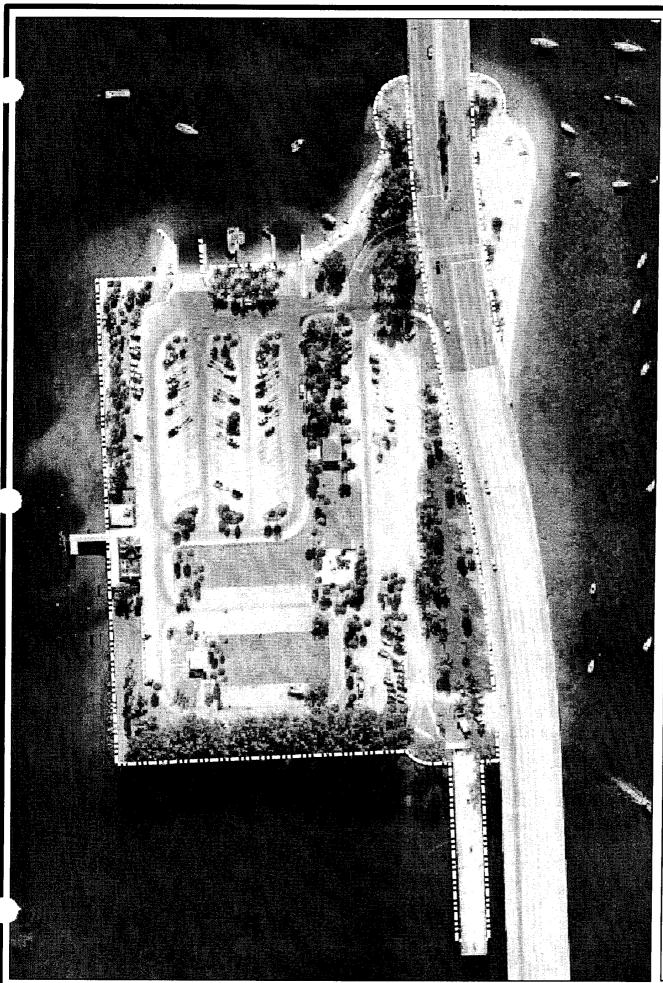
HABITAT: Estuarine

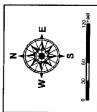
VEGETATION: Johnsons sea grass

ANIMALS: Feral Cats, Squirrels, Rats

TRAP HISTORY: 11/17/01 2 Cats

3/4/02 2 Cats 3/5/02 5 Cats





Source:
Palm Beach County GIS Coordination
Palm Beach County Parks and Recreation
Image Date: 2002

PHIL FOSTER PARK



PALM BEACH COUNTY
PARKS AND RECREATION DEPARTMENT

River Bend Park

ENTRANCE: 9060 Indiantown Rd., Jupiter, FL 33478

CLASS: Regional

ACREAGE: 630.69 Acres

Hours: Sunrise-Sunset

FACILITIES: Canoe rental concession

Parking spaces: 40 Under Development

- Interpretative Center
- Restrooms
- Parking
- Picnic Tables
- Caretaker Residence

HABITAT: Riverine, Transitional Wetland, Transitional Upland, Upland, Hammock, and Pine Flatwood

NOTE: This Park is under development. The traditional habitats are being restored which involves the removal of many species of exotics and the planting of native vegetation. There are many native species of animals in the park and the restoration will enhance their habitat and support their ability to thrive.

ANIMALS: Nuisance: Coyote (seasonal), Feral Cats (in past), Dogs (on occasion)

Of Concern: Wild Turkey, Deer, Sandhill Crane

TRAP HISTORY: Feral Cats (none currently on site)

Hogs (have been eliminated)





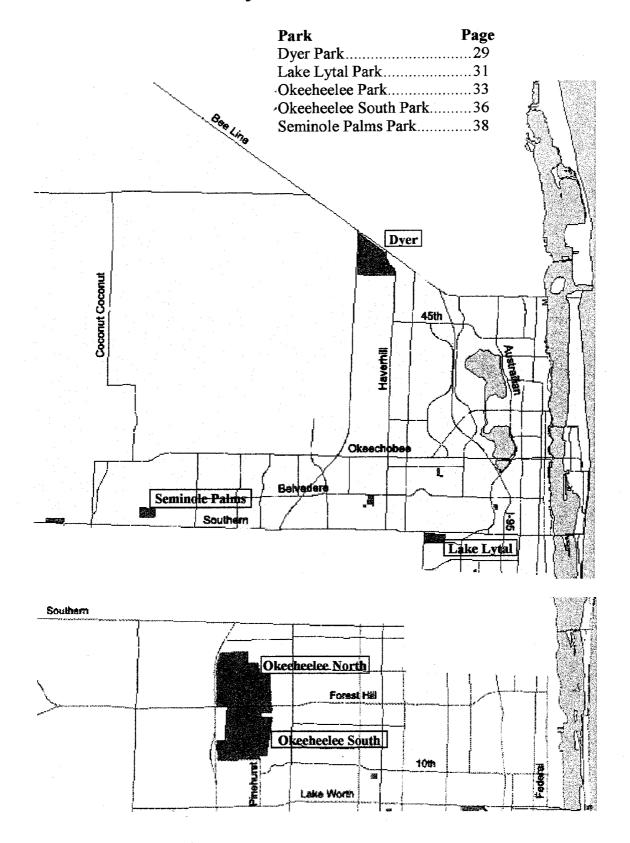
RIVERBEND PARK

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urce: Im Beach County GIS Coordination Im Beach County Parks and Recreation Map Date: July 31, 2003 Crested By: B. Hamilton File: Riverbend Aerial.pdf



Palm Beach County North Central District Parks



Dyer

ENTRANCE: 7301 Haverhill Road, West Palm Beach, FL 33412

CLASS: Regional

ACREAGE: 560.38 Acres

Hours: Sunrise-Sunset, Lighted facilities open until 11 pm

FACILITIES: Freshwater fishing

Baseball field Softball field

Football/soccer fields: 3
Basketball courts: 2
Sand volleyball courts: 2
Children's play area
Bicycle path: 4.12 miles
Mountain bike trail: 3.2 miles
Equestrian trail: 3.4 miles
Reserved group picnic pavilion

Picnic areas with grills Restroom facilities Parking spaces: 250

LOCATION OF:

HABITAT: Pine Flatwoods

Cypress swamp Lake/Pond

VEGETATION: South Florida Slash pine, Cabbage palm, Saw palmetto, Gallberry,

Bald/Pond cypress, Cabbage palm, Myrsine, Pond apple

Shoreline vegetation, Wax myrtle, Pond apple, Myrsine, Cabbage palm

ANIMALS: Feral Cats

TRAP HISTORY: 2/22/02 2 Cats 1/22/03 1 Cat

 2/26/02
 1 Cat
 8/27/03
 2 Cats

 2/27/02
 1 Cat
 8/28/03
 3 Cats

 1/28/02
 1 Cat
 9/10/03
 1 Cat

3/12/02 2 Cats 10/23/02 1 Cat





DYER PARK

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Lake Lytal

ENTRANCE: 3645 Gun Club Rd., West Palm Beach, FL 33406

CLASS: District

ACREAGE: 70.4 Acres

Hours: Sunrise-Sunset, Lighted facilities open until 11 pm

FACILITIES: Swimming pool (50 meter)

Restroom facilities with showers and lockers

Children's wading pool Interactive water playground

Two-story water slide with 3 flumes

Baseball fields: 4

Football/soccer fields: 5

T-ball field Softball field: 2 Tennis courts: 6

Basketball/multi-purpose courts: 4 Racquetball/handball courts: 4

Children's play areas: 2

Activity building

Snack bars (open during league play only): 3

Reserved group picnic pavilion

Volleyball area

Picnic areas with grills Restroom facilities Parking spaces: 865

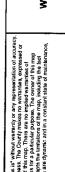
LOCATION OF: Armed Forces Memorial Park

HABITAT: Pine Flatwoods

VEGETATION: South Florida Slash pine, Brazilian pepper

ANIMALS: Squirrels





LAKE LYTAL PARK

PALM BEACH COUNTY
PARKS AND RECHEATION DEPARTMENT

Okeeheelee

ENTRANCE: Located on Forest Hill Blvd., West Palm Beach, FL

CLASS: Regional

ACREAGE: 900 Acres

HOURS: Sunrise-Sunset, Lighted facilities open until 11 pm

FACILITIES: Lake frontage (35,200 feet)

Fishing (freshwater-stocked)

Fishing pier: 1

Water skiing courses (permit and fee required): 5

Boat launching ramp: 2

Boat/trailer parking spaces: 13 Boat slip (day use only): 19

Baseball fields: 5 Softball fields: 4

Football/soccer/rugby fields: 5

Volleyball courts: 6

Concession building (sports equipment)

Children's play areas: 5

Special event/performing arts area: 1

BMX track concession: 1

Tennis courts: 8

Nature center (call for hours): 1

Interpretive nature trail (0.75 mile): 1

Nature trails (1.2miles)

27 hole golf course/pro shop/driving range/practice putting Green/chipping area

mobile snack bar (open on weekends)

Snack bars (open during league play only): 2

Reserved group pavilions: 4 Family picnic shelters: 40 Picnic areas with grills Restroom facilities

Parking spaces (10 accessible spaces): 1,720

LOCATION OF:

Page 1 of 2

HABITAT: Pine Flatwoods

Cypress swamp Lake/pond Marsh

VEGETATION: South Florida Slash pine, Cabbage palm, Saw palmetto, Gallberry, Wire grass

Bald/Pond cypress, Cabbage palm, Myrsine, Wax myrtle

Spike rush, Bulrush, and shoreline vegetation, Grasses/woody shrubs Spatter dock, Spike rush, Shoreline vegetation, Wax myrtle, Grasses

ANIMALS: Feral Cats, Muscovy Ducks, Raccoons, Gopher Tortoises, Alligator, Squirrels, Iguanas, Monitor Lizard

TRAP HISTORY: 2/28/01 2 Kittens

3/1/01 3 Cats

8/2/01 1 Cat, 3 Kittens

6/13/02 3 Cats 12/3/02 1 Cat 12/4/02 2 Cats

12/17/02 1 Dog, 1 Cat 8/26/03 1 Cat, 3 Kittens

12/5/03 5 Cats, 3 Kittens - Golf Course





PALM BEACH COUNTY
PARKS AND RECREATION DEPARTMENT

OKEEHEELEE PARK

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Cource: laim Beach County GIS Coordination laim Beach County Parks and Recreation name Bate: 2002 Map Date: July 24, 2003 Creeted By: B. Hamilton File: Okesheelee Aensl.pdf



Okeeheelee South (a.k.a. Cholee)

ENTRANCE: Located on Forest Hill Blvd., West Palm Beach, FL

CLASS: Regional

ACREAGE: 802 Acres

Hours: Sunrise-Sunset

FACILITIES: Equestrian trails (13 miles)*

Mountain Bike Trails (open on east side of Pinehurst Drive)

* Equestrian Trails are temporarily closed due to construction

LOCATION OF:

HABITAT: Pine Flatwoods

VEGETATION: South Florida Slash pine, Cabbage palm, Saw palmetto, Gallberry, Dahoon holly,

Wire grass, Melaleuca, Brazilian pepper, Earleaf acacia, Australian pine

ANIMALS:





PALM BEACH COUNTY
PARKS AND RECREATION DEPARTMENT

CHOLEE PARK

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Source: Paim Seach County GIS Coordination Parm Beach County Parks and Recreation Image Date: 2002 Map Date: April 17, 2003 Creeted By: B. Hamilton File: Cholee Aerial.pdf



SCALE: 1" = 900"

Seminole Palms

ENTRANCE: 151 Lamstein Lane, Royal Palm Beach

CLASS: District

ACREAGE: 70 Acres

Hours: Sunrise-Sunset, Lighted facilities open until 11 pm

FACILITIES: Calypso Bay Waterpark (call for hours)

2 water slides/river ride/lap pool/interactive water playground/food Concession

Baseball fields: 6 Softball fields: 2 Multipurpose fields: 4 Children's play area: 1

Group picnic pavilion (permit not required)

Picnic areas with grills Restroom facilities Parking available

LOCATION OF:

HABITAT: Pine Flatwoods

Cypress swamp

VEGETATION: South Florida Slash pine, Cabbage palm, Saw palmetto, Gallberry,

Bald/Pond cypress, Cabbage palm, Myrsine, Wax myrtle

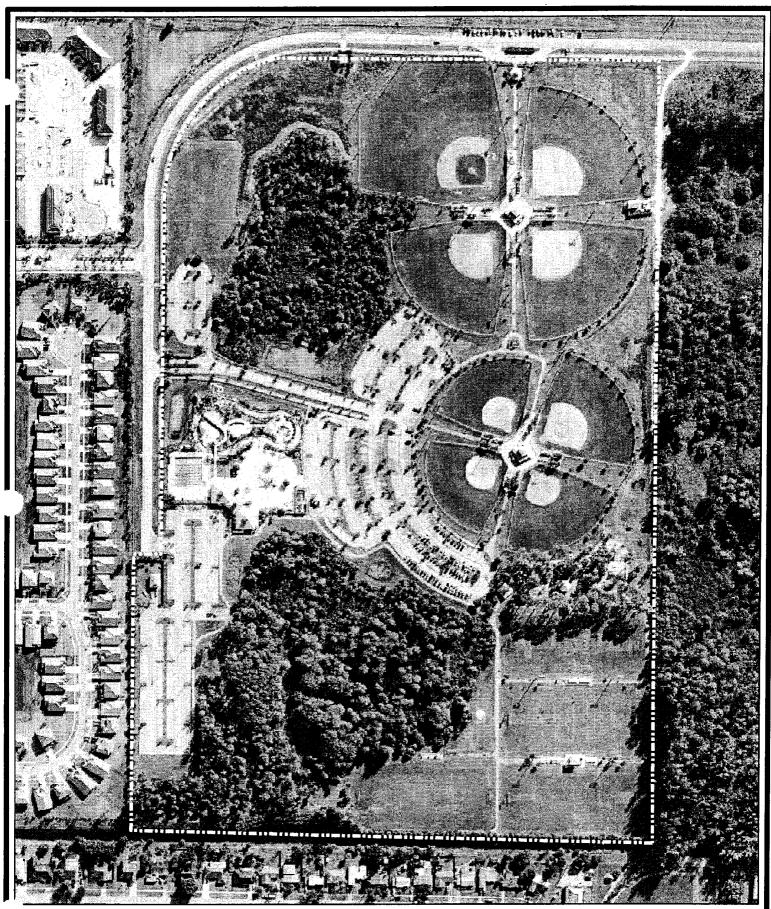
ANIMALS: Raccoons, Fox, Armadillo, Squirrels

TRAP HISTORY: 3/11/03 2 Raccoons

3/12/03 2 Raccoons 3/13/03 1 Raccoon 12/10/03 5 Raccoons 12/11/03 2 Raccoons 12/12/03 4 Raccoons 12/16/03 2 Raccoons

12/17/03 2 Raccoons, 1 Cat

12/18/03 2 Raccoons





PALM BEACH COUNTY
PARKS AND RECREATION DEPARTMENT

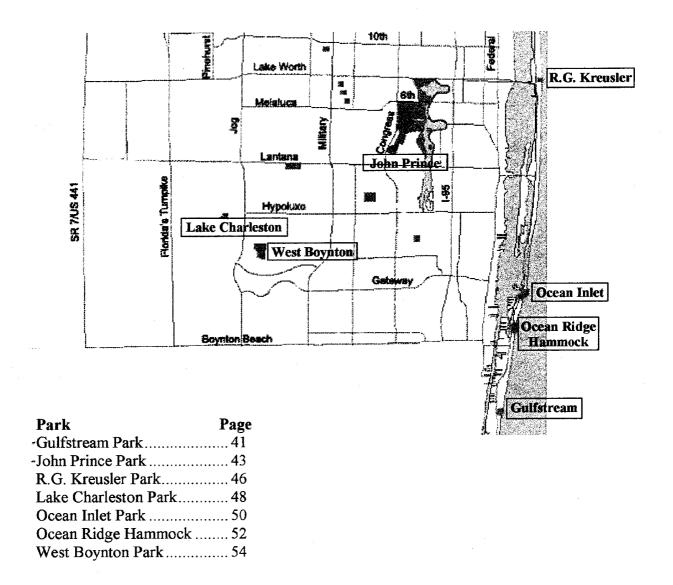
SEMINOLE PALMS PARK

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ource: Ilm Beach County GIS Coordination Ilm Beach County Parks and Recreation age Date: 2002 Map Date: July 31, 2003 Created By: B. Hamilton File: Seminole Aerial.pdf



Palm Beach County Central District Parks



Gulfstream

ENTRANCE: 4489 N. Ocean Blvd., Gulfstream, FL 33483

CLASS: Beach

ACREAGE: 6.83 Acres

Hours: Sunrise-Sunset

FACILITIES: Guarded Beach Frontage (600ft.)

(salt water fishing and surfing not allowed in guarded swimming areas)

Children's play area Picnic areas with grills Restroom facilities Outdoor showers Parking spaces: 86

LOCATION OF: South District Beach Patrol Headquarters

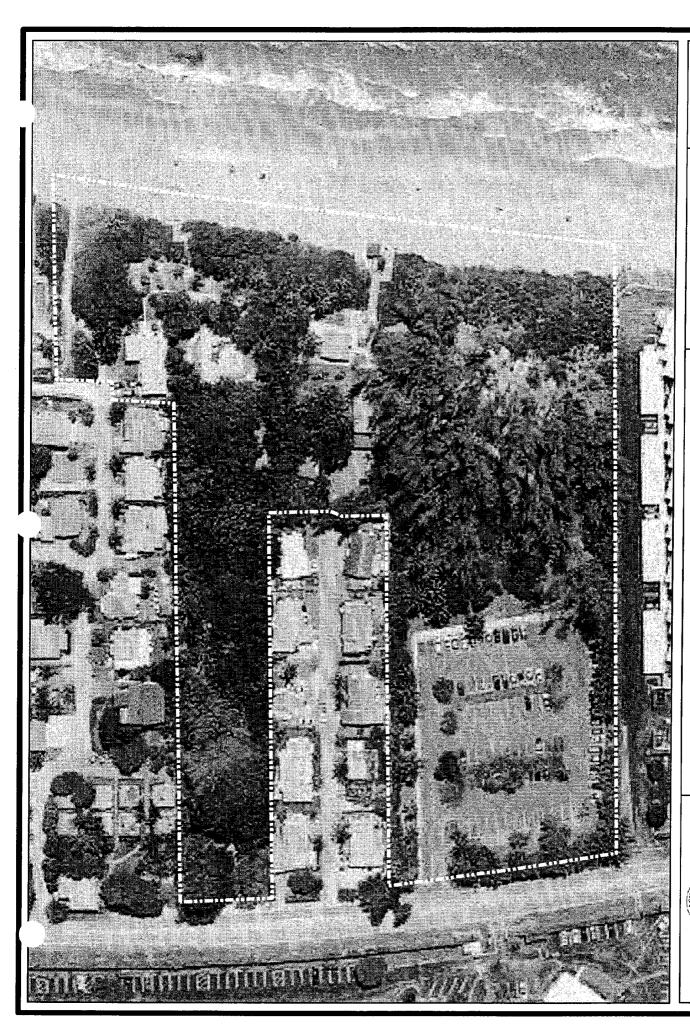
HABITAT: Coastal dune & strand

VEGETATION: Sea grape, Sea oats, Railroad vine, Australian pine, Scaevola

ANIMALS: Feral Cats, Raccoons, Opossums, Squirrels, Parrots (on occasion)

TRAP HISTORY: 8/10/01 2 Cats

8/17/01 1 Cat 1/30/02 3 Cats 1/31/02 3 Cats 9/17/02 1 Kitten 9/19/02 3 Cats 1/22/03 1 Cat





GULFSTREAM PARK

PALM BEACH COUNTY
PARKS AND RECREATION DEPARTMENT

John Prince

ENTRANCE: 2700 6th Ave. S., 4759 S. Congress Ave., 2520 Lake Worth Rd

Lake Worth, Fl 33461

CLASS: Regional

ACREAGE: 726.36 Acres (Includes 338 Lake Acres)

Hours: Sunrise-Sunset, Lighted facilities open until 11pm

FACILITIES: Lake frontage (35,200 feet)

Fishing (freshwater)

Water skiing

Boat launching ramps: 4

Boat/trailer parking spaces: 58

Fishing pier: 2 Softball fields: 3 Tennis courts: 6 Volleyball areas: 6

Children's play areas (1 accessible area): 9

Golf center concession: 1 (driving range/miniature golf/pro shop/batting cages)

Bocce court: 1

Bicycle path: 5 miles

Exercise trail: 20 stations/1.4 miles Wheelchair trail: 15 stations/0.5 miles Interpretive nature trail: 0.5 miles Camping (R.V./tent sites): 266 office hours: 7:00am-9:30pm

Activity building:1

Reserved group picnic pavilions: 5 Reserved group picnic area: 1 Picnic areas with grills: 6

Restroom facilities

Parking spaces (36 accessible spaces): 1,533

LOCATION OF: Parks and Recreation Department Administrative Offices

HABITAT: Marsh

Mixed

Lake/Pond

VEGETATION: Pond apple, Wax myrtle, Coco plum, Grasses, Lygodium, Melaleuca Several native eco-systems represented at this site

Spatter dock, Alligator flag, Arrowhead, Spike rush, Phragmites

ANIMALS: Muscovy ducks, Feral cats, Raccoons, Squirrels, Armadillo, Iguanas, Gopher tortoise, Alligators

TRAP HISTORY: 1/24/01 3 Cats - Campground 3/27/01 1 Cat, 3 Kittens – Campground 8/17/01 1 Cat – Campground 12/2/02 1 Cat 3/1/02 1 Cat 1 Cat – Campground 3/27/02 5/7/02 1 Cat – Campground 5/8/02 1 Cat – Campground 5/8/02 4 Raccoons - Campground 5/22/02 1 Raccoon, 1 Cat – Campground 5/23/02 1 Raccoon, 1 Cat – Campground 5/29/02 1 Cat – Campground 9/19/02 1 Raccoon 9/27/02 9 Kittens 2/27/03 1 Raccoon 7/30/03 1 Cat – Campground 10/13/03 1 Cat – Campground 10/23/03 1 Cat – Campground





JOHN PRINCE PARK

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ource: aim Beach County OIS Coordination aim Beach County Parks and Recreation nage Date: 2002 Map Date: July 24, 2003 Created By: B. Hamilton File: John Prince Aenal.pdf



R.G. Kreusler

ENTRANCE: 2695 S. Ocean Blvd., Palm Beach, FL 33480

CLASS: Beach

ACREAGE: 1.98 Acres

Hours: Sunrise-Sunset

FACILITIES: Guarded beach frontage (450 feet)

(salt water fishing and surfing not allowed in guarded swimming areas)

Restroom facilities Outdoor showers

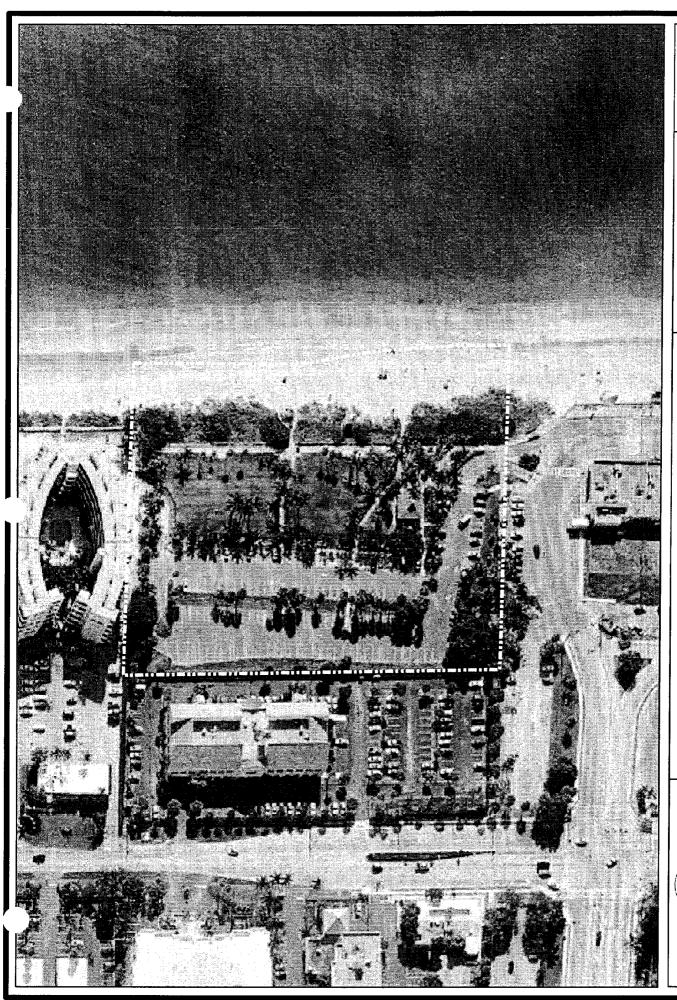
Metered parking spaces

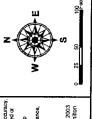
LOCATION OF:

HABITAT: Coastal dune and strand

VEGETATION: Sea grape, Sea oats, Railroad vine

ANIMALS:





R.G. KREUSLER PARK

Lake Charleston

ENTRANCE: 7001 Charleston Shores Blvd., Lantana, Fl 33467

CLASS: Community

ACREAGE: 9.5 Acres

Hours: Sunrise-Sunset; Lighted facilities open until 11pm when in use

FACILITIES: Softball fields: 4

Children's play area: 1

Snack concession (during league play only)

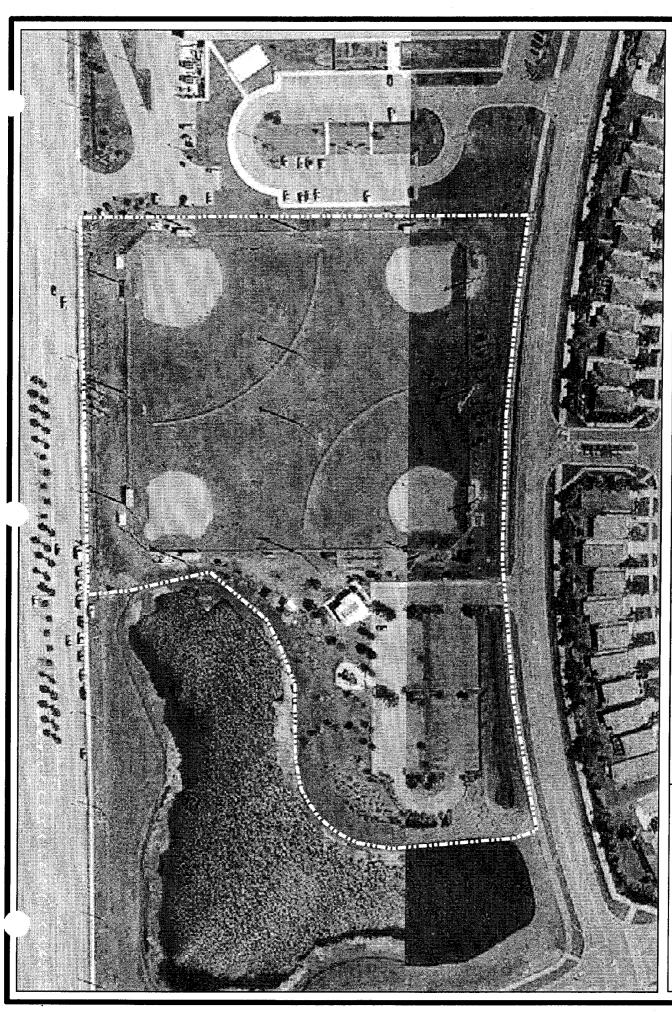
Restroom facilities Parking spaces

LOCATION OF:

HABITAT:

VEGETATION:

ANIMALS: Burrowing owls





LAKE CHARLESTON PARK



Ocean Inlet

ENTRANCE: 6990 N. Ocean Blvd., Ocean Ridge, FL 33435

CLASS: Beach

ACREAGE: 10.29 Acres

HOURS: Sunrise-Sunset (Inlet Fishing 24 Hours)

FACILITIES: Intracoastal Waterway frontage (1100 feet)

Guarded beach frontage (600 feet)

(salt water fishing and surfing not allowed in guarded swimming areas)

Jetty Marina

Boat slips (rental): 20 Children's play area Ocean overlook Seating pavilions: 2

Snack bar

Family picnic shelters: 5

Volleyball area Restroom facilities Outdoor showers

Parking spaces (6 accessible spaces): 262

LOCATION OF:

HABITAT: Coastal dune and strand

VEGETATION: Sea oats

ANIMALS: Squirrels, Parrots (on occasion)





PALM BEACH COUNTY
PARKS AND RECREATION DEPARTMENT

OCEAN INLET PARK

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Ocean Ridge Hammock

ENTRANCE: 6620 North Ocean Blvd., Ocean Ridge, FL 33435

CLASS: Beach

ACREAGE: 8.54 Acres

HOURS: Sunrise-Sunset

FACILITIES: Unguarded beach frontage

Fishing (salt water)

No on-site restroom facilities

Outdoor storage Parking spaces

LOCATION OF:

HABITAT: Coastal dune and Strand

Tropical hammock

VEGETATION: Sea grape, Sea oats, Railroad vine, Morning glory

Strangler fig, Gumbo limbo, Cabbage palm, Fire bush, Wild coffee

ANIMALS:





OCEAN RIDGE HAMMOCK PARK

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ource; alm Beach County GIS Coordination alm Beach County Parks and Recreation page Date: 2002 Map Date: July 24, 2003 Created By: 8. Hamilton File: Ocean Ridge Aeral.pd



West Boynton

ENTRANCE: 6000 Northtree Blvd., Boynton Beach, FL 33463

CLASS: District

ACREAGE: 47.12 Acres

Hours: Sunrise-Sunset

FACILITIES: Baseball fields: 6

Multipurpose fields: 3

Softball field

Lighted roller hockey rinks: 2

Sand volleyball court

Fitness trail

Children's play area

Recreation Center (call for hours)

Gymnasium/meeting room/game room/offices

Reserved group picnic pavilion

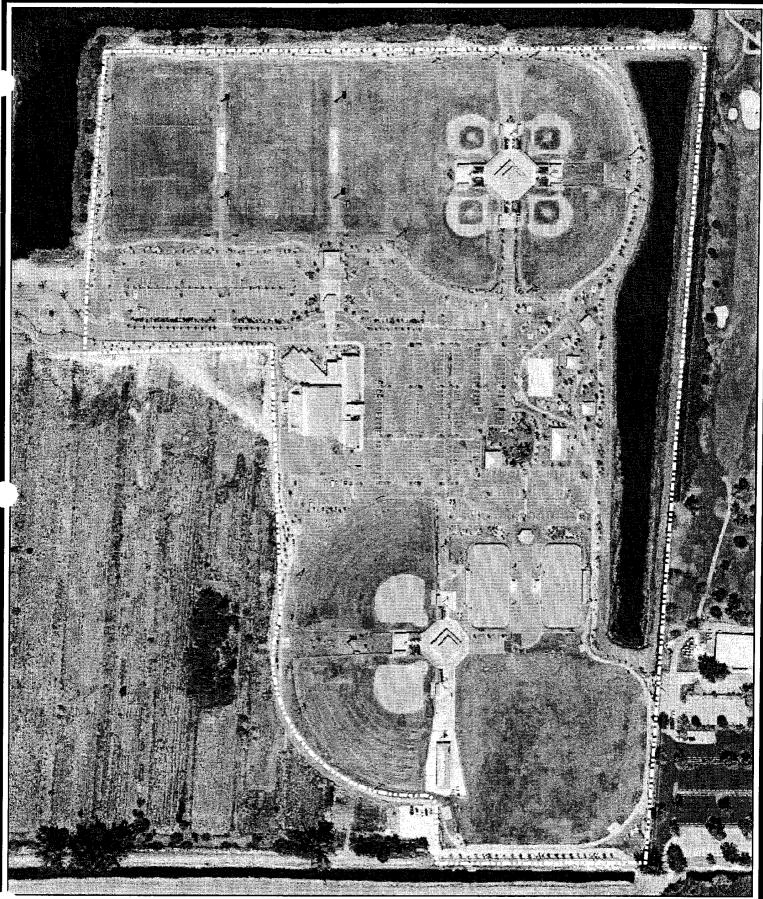
Picnic shelters Restroom facilities Parking spaces

LOCATION OF:

HABITAT: Lake/Pond

VEGETATION: Pickerelweed, Alligator flag, Arrowhead, Spatter dock, Spike rush

ANIMALS: White domestic mice





PALM BEACH COUNTY
PARKS AND RECREATION DEPARTMENT

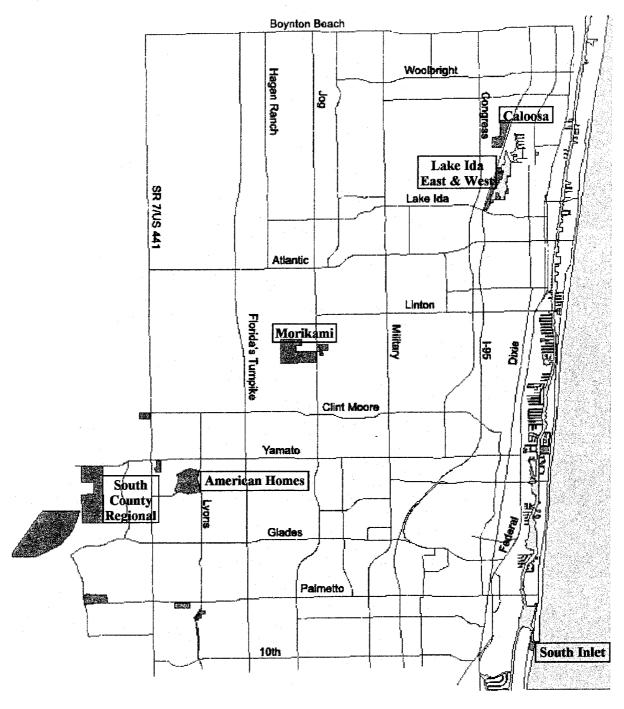
WEST BOYNTON PARK

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Source: Pake Beach County GIS Coordination Pake Beach County Parks and Recreati mage Date: 2002 Map Date: July 24, 2003 Created By: B. Hamilton File: West Boynton Aerial.p.



Palm Beach County South District Parks



Park	Page
*American Homes Park	57
Caloosa Park	59
Lake Ida Park	61
Morikami Park	63
South County Regional Par	k. 65
South Inlet Park	68

American Homes

ENTRANCE: 9779 Liberty Road, Boca Raton, Fl 33434

CLASS: Community

ACREAGE: 16.52 Acres

Hours: Sunrise-Sunset

FACILITIES: Jogging trail: 0.4 miles

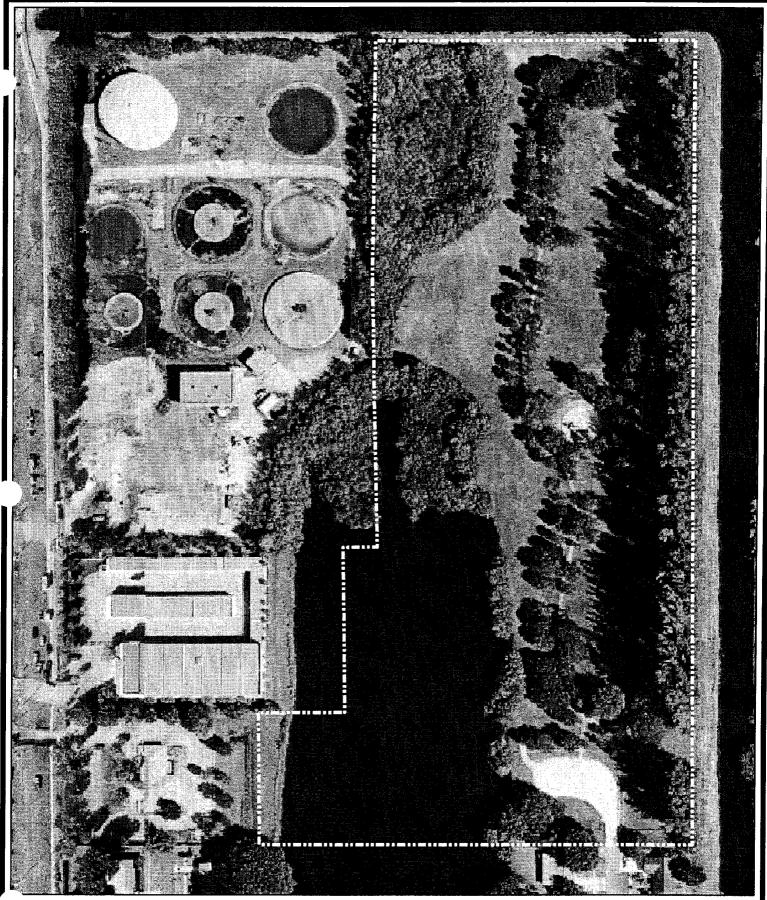
Children's play area Open play fields Parking spaces: 24

LOCATION OF:

HABITAT: Lake/Pond

VEGETATION: Shoreline vegetation, Brazilian pepper

ANIMALS: Iguanas





PARKS AND RECREATION DEPARTMENT

AMERICAN HOMES PARK

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ource: alm Beach County GIS Coordination alm Beach County Parks and Recreation nage Date: 1999 Map Date: July 31, 2003 Created By: B. Hamilton File: American Homes Aerial.pdf



Caloosa

ENTRANCE: 1300 S.W. 35th Ave., Boynton Beach, FL 33426

CLASS: District

ACREAGE: 64.58 Acres

Hours: Sunrise-Sunset, Lighted facilities open until 11 pm

FACILITIES: Lake frontage (1,850 feet)

Fishing (freshwater-stocked)

Baseball fields: 2 Softball fields: 2 Multipurpose fields: 2

Basketball/multi-purpose courts: 4 Racquetball/handball courts: 16

Tennis courts: 4

Lighted in-line hockey rinks: 2

Volleyball court Children's play area Bicycle access

Exercise trail: 12 stations/1.0 mile

Wheelchair course (20 stations, 1.25 miles): 1 Snack bar (open during league play only)

Reserved group picnic pavilion

Picnic areas with grills Restroom facilities Parking spaces: 419

LOCATION OF:

HABITAT: Lake/Pond

VEGETATION: Shoreline vegetation, Cypress, Wax myrtle

ANIMALS: Squirrels, Moles

TRAP HISTORY: 12/16/02 1 Fox





PALM BEACH COUNTY
PARKS AND RECREATION DEPARTMENT

CALOOSA PARK

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Source: Paim Beach County GIS Coordination Paim Beach County Parks and Recreation Image Date: 2002

Map Date: March 12, 2003 Created By: B. Hamilton



Lake Ida East & West

ENTRANCE: 2929 Lake Ida Rd., Delray Beach, FL 33444

CLASS: District

ACREAGE: 209.26 Acres (includes lake acreage)

Hours: Sunrise-Sunset

FACILITIES: Lake frontage (9,600 feet)

Fishing pier Water skiing Dog park

Lake observation platform

Volleyball area

Boat launching ramps: 2

Boat/trailer parking spaces: 43

Children's play area

Reserved group picnic pavilion: 2

Picnic areas with grills Restroom facilities Parking spaces: 367

LOCATION OF: Delray Beach Playhouse

HABITAT: Lake/Pond

Marsh

VEGETATION: Shoreline vegetation and grasses, Brazilian pepper approximately 500" north of

entrance.

Bulrush, Pickerelweed, Alligator flag, Arrowhead, Cattails

ANIMALS: Iguanas, Muscovy Ducks, Squirrels, Raccoons, Rats





PALM BEACH COUNTY
PARKS AND RECREATION DEPARTMENT

LAKE IDA PARK

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Source: Palm Beach County GIS Coordination Palm Beach County Parks and Recreati mage Date: 2002 Map Date: July 24, 2003 Created By: B. Hamilton File: Lake Ida Aerial pdf



Morikami

ENTRANCE: 4000 Morikami Park Rd., Delray Beach, FL 33446

CLASS: Regional

ACREAGE: 188.53 Acres

Hours: Sunrise-Sunset, Museum: Tues-Sat (10:00 am-5:00 pm)

FACILITIES: Special event/performing arts area

Interpretive nature trail Restroom facilities Family picnic shelters: 6

Reserved group picnic pavilion

225-seat theater Volleyball area Picnic area with grills Parking spaces: 311

Museum of Japanese Culture

Japanese Gardens

Yamato-kan museum building

Bonsai collection Cornell Café

LOCATION OF: Yamato Pioneer Memorial

Challenger Astronaut Memorial

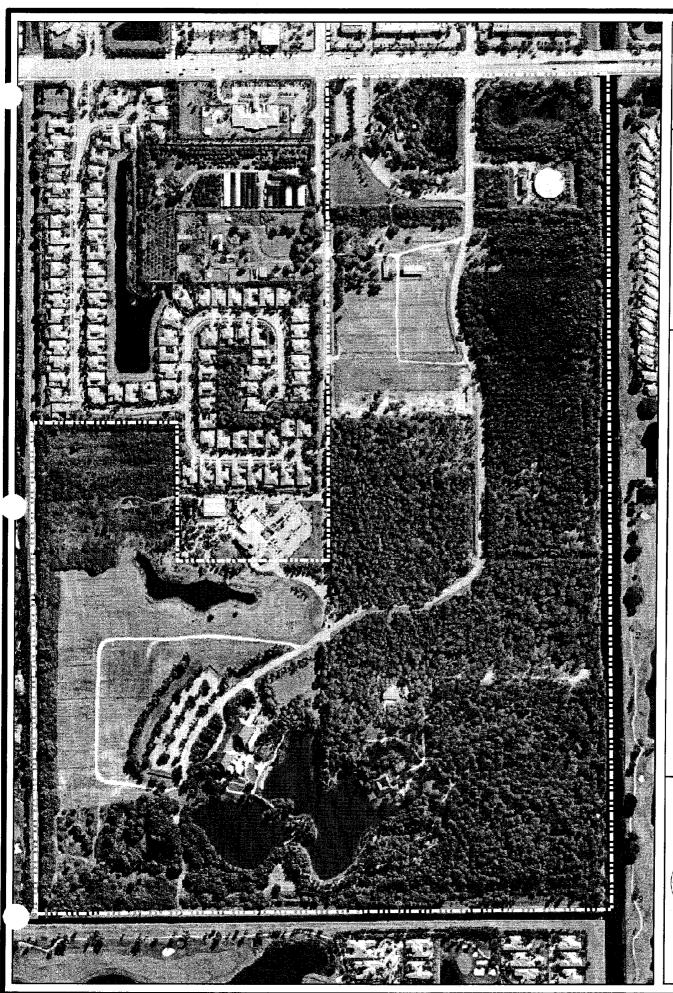
HABITAT: Pine Flatwoods

Cypress swamp Lake/Pond

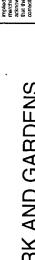
VEGETATION: South Florida Slash pine, Cabbage palm, Saw palmetto, Gallberry, Dahoon holly

Bald/Pond cypress, Cabbage palm, Myrsine, Wax myrtle Spatter dock, Shoreline vegetation, Wax myrtle, Grasses

ANIMALS: Bobcat, Gopher Tortoise, Iguana, Otters, Alligators









PARKS AND RECREATION DEPARTMENT

South County Regional

ENTRANCE: 11200 Park Access Rd., Boca Raton, FL 33498

CLASS: Regional

ACREAGE: 903.21 Acres

Hours: Sunrise-Sunset, Lighted facilities open until 11 pm

FACILITIES: Coconut Cove Waterpark and Recreation Center

2 water slides/river ride/Interactive water playground/ food concession

Baseball fields: 4
Softball fields: 4
Multipurpose field

Multipurpose fields: 5 Tennis courts: 19

Racquetball courts*: 12
Basketball courts*: 2
Sand volleyball courts: 2
Paved volleyball courts: 3
Children's play areas: 4
Remote control car track
Remote control airplane field

Bike path: 2.0 miles

Exercise Course: 20 stations/1.2 miles Daggerwing Nature center (call for hours)

Meeting rooms: 2

Boardwalk and interpretive nature trails (0.5 miles) Snack Concession (open during league play only): 1

Reserved group picnic pavilions: 2

Picnic shelters Restroom facilities Parking spaces: 746

LOCATION OF:

HABITAT: Cypress swamp

Lake/Pond Marsh

Low Hammock

Page 1 of 2

VEGETATION: Bald/Pond cypress, Cabbage palm, Myrsine, Wax myrtle

Shoreline vegetation, Grasses/Woody shrubs

Spatter dock, Spike rush, Shoreline vegetation, Wax myrtle, Grasses

ANIMALS: Raccoon, Alligators, Iguanas, Parrots, Armadillos, Rats

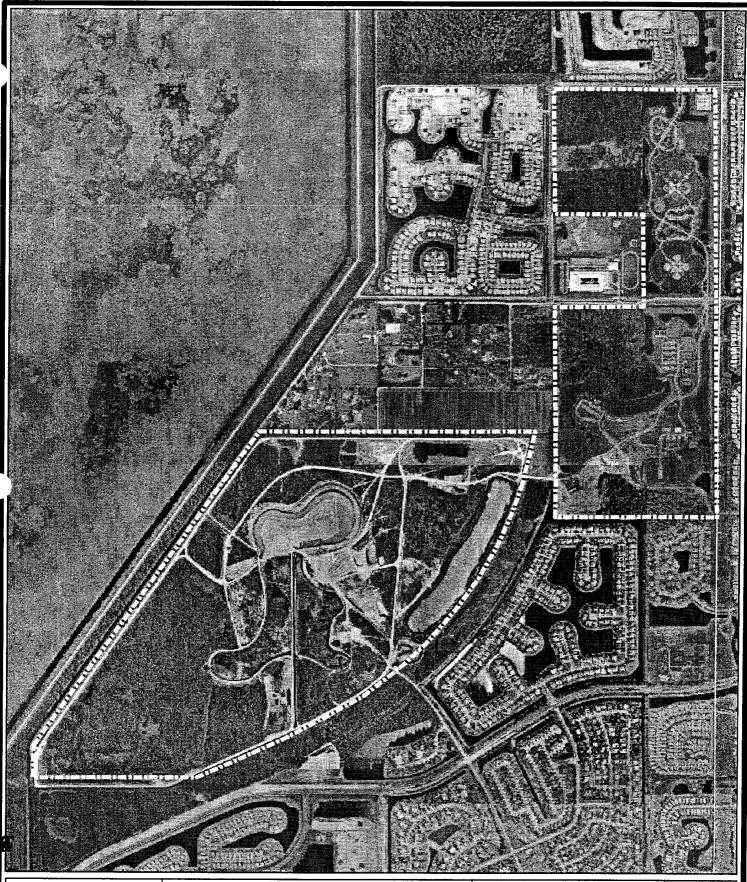
TRAP HISTORY: 2/26/03 1 Raccoon

 3/11/03
 3 Raccoons

 3/12/03
 2 Raccoons

 3/13/03
 3 Raccoons

 4/30/03
 2 Raccoons





South County Regional Park

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South Inlet

ENTRANCE: 1298 S. Ocean Blvd., Boca Raton, FL 33432

CLASS: Beach

ACREAGE: 11.1 Acres

Hours: Sunrise-Sunset

FACILITIES: Guarded beach frontage (850 feet)

Salt water fishing

Pier/jetty

Reserved group picnic pavilion

Volleyball area

Picnic areas with grills Restroom facilities Outdoor showers

Parking spaces (parking fee): 77

LOCATION OF:

HABITAT: Coastal dune & strand

Tropical Hammock

VEGETATION: Sea grape, Sea oats, Railroad vine, Morning glory

Strangler fig, Gumbo limbo, Cabbage palm, Fire bush, Wild coffee

ANIMALS: Feral Cats, Raccoons, Squirrels, Iguanas





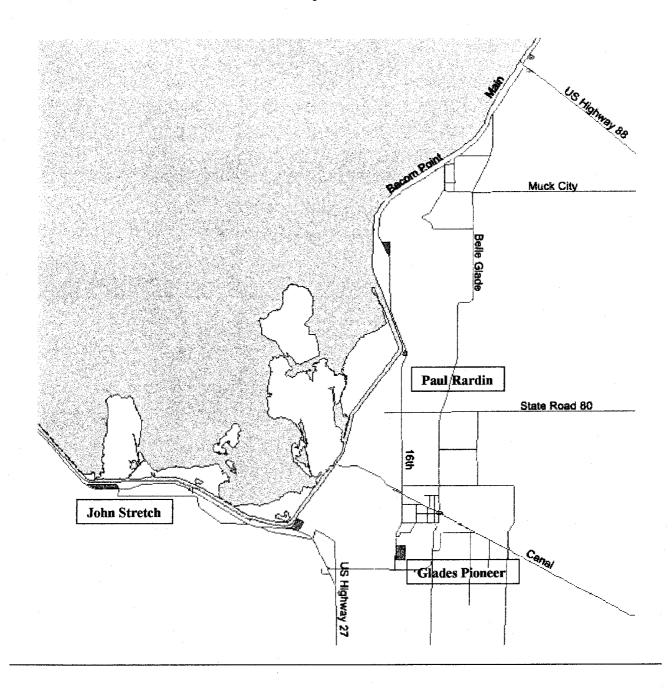
SOUTH INLET PARK

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lource: falm Beach County GIS Coordination falm Beach County Parka and Recreation mage Date: 2002 Map Date: August 5, 2003 Created By: B. Hamilton File: South .nlet Aerial.pdf



Palm Beach County Glades District Parks



Park	Page
Glades Pioneer Park	71
John Stretch Park	73
Paul Rardin Park	75

Glades Pioneer

ENTRANCE: 866 S.R. 715, Belle Glade, FL 33430

CLASS: District

ACREAGE: 64.2 Acres

HOURS: Sunrise-Sunset, Lighted facilities open until 11 pm

FACILITIES: Baseball field

Softball fields: 2 Tennis courts: 2

Multipurpose fields: 2 Children's play areas: 4 Basketball courts: 4

Bicycle/walking path: 1 mile

Snack bar (open during league play only)

Reserved group picnic pavilion Family picnic shelters: 17

Restroom facilities Parking spaces

LOCATION OF:

HABITAT: Lake/Pond

VEGETATION: Shoreline grasses

ANIMALS:





GLADES PIONEER PARK

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John Stretch

ENTRANCE: 47225 U.S. Hwy. 27, Lake Harbor, Fl 33459

CLASS: District

ACREAGE: 56.2 Acres

Hours: Sunrise-Sunset

FACILITIES: Lake frontage

Fishing (freshwater)

Multi-purpose field (cricket)

Basketball court Children's play area

Reserved group picnic pavilion

Volleyball

Family picnic shelters: 20 Picnic areas with grills Restroom facilities

Access to U.S. Army Corps of Engineers small boat launch area

(very steep)
Parking spaces

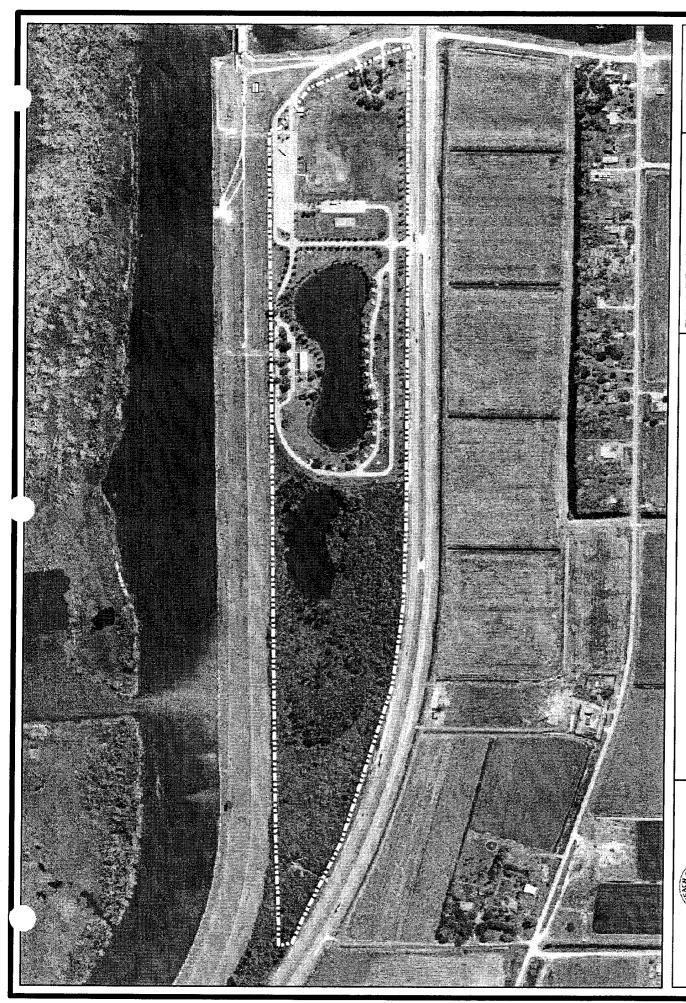
LOCATION OF: South Florida Water Management District

District's Historical Pump Display

HABITAT: Lake/Pond

VEGETATION: Cattails

ANIMALS:





JOHN STRETCH PARK

PALM BEACH COUNTY
PARKS AND RECREATION DEPARTMENT

Paul Rardin

ENTRANCE: 4600 Bacom Point Rd., Pahokee, FL 33430

CLASS: Community

ACREAGE: 6.65 Acres

Hours: Sunrise-Sunset

FACILITIES: Children's play area

Reserved group picnic pavilion Family picnic shelters: 21

Access to U. S. Army Corps of Engineers small boat ramp (steep)

Boat/trailer parking spaces (grass): 6

Picnic areas with grills Restroom facilities Parking spaces: 30

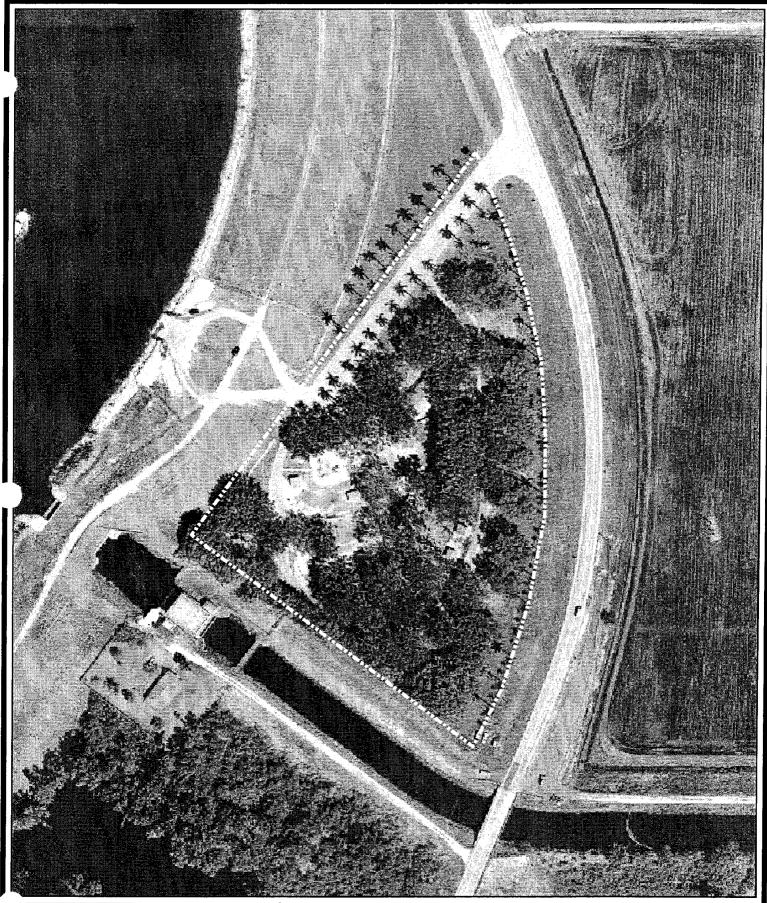
LOCATION OF:

HABITAT: No true habitat

VEGETATION: Ficus, Royal palm, Cabbage palm, Sporadic woody herbaceous shrubs

ANIMALS: Feral Cats

TRAP HISTORY: 6/30/03 3 Kittens





PAUL RARDIN PARK

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